

記転写手段上に順次重ね合わせて形成したカラートナー像を前記転写手段に保持させる転写材の一方の面に一層として転写し、前記転写手段上に形成したトナー像を前記トナー像を形成するカラー面像形成装置において、前記転写手段に共通のバイアス電圧を印加すると共に、前記像形成体の基体に異なるバイアス電圧を印加することを特徴とするカラー面像形成装置（請求項3に係わる発明）によって達成される。

【0007】

【発明の要旨】 本発明の各カラー面像形成装置は、図1ないし図3に示すような何れもドラム状の転写体10Aあるいは中間転写体10B（以下総称して転写体10とする）を備えており、その周囲にイエロー（Y）、マゼンタ（M）、シアン（C）および黒（K）の各面像形成ユニット20が配設されている。

【0008】 前記の転写体10は、図4に示す如く共に導電性の例えばアルミニウム基体11上に厚さ1～10mm、電抵抗 $10^2 \sim 10^6 \Omega \cdot \text{cm}$ の導電性層12と更にその上に厚さ50～500 μm 、電抵抗10 $\sim 10^4 \Omega \cdot \text{cm}$ の分離用の絶縁性フィルム層13が設けられている。

【0009】 前記の転写体10は前記の各面像形成ユニット20の備えるドラム状の像形成体に対し、例えば高抵抗の絶縁性フィルム層13や像形成体の感光層の転写体10の導電性層12の層より大きくする等の措置により電気的に絶縁状態とされており、それによって各像形成体に対して独立した転写バイアス電圧の印加を可能としている。

【0010】 前記の転写体10は図示しない前面・後面・側面に、図示しない輪受けによって固定され、さらに、転写体10の回転軸を後面パネル外まで延設し、その先端に図5に示すようなフライホイール10Fが設けられている。このフライホイール10Fは、転写体10の回転が揺動なく、スムーズに行うために、慣性力を付与するものである。

【0011】 4組の面像形成ユニット20Y、20M、20C、20Kは、それぞれ形成するトナー像の色が異なるだけで、同じ構成をしているので、面像形成ユニット20Yを例にして説明する。

【0012】 面像形成ユニット20Yは、図4に示す如く像形成体である感光体ドラム21Yの周囲に、像形成体帯転写手段22Y（以下、単に帯転写手段22Y、あるいは、帯電路22Yという）、露光手段23Y、現像手段24Y、像形成体クリーニング手段25Y（以下、単にクリーニング手段25Y、あるいは、クリーニングブレード25Yという）を配置し、感光体ドラム21Y上にイエロートナー像を形成するものである。また、本実施の形態においては、この面像形成ユニット20Yのうちの感光体ドラム21Y、帯電路22Y、現像手段24

Y、クリーニング手段25Yを一体化してプロセスカートリッジとして、移動可能としているが、これに限らず、少なくとも感光体ドラム21Yと現像手段24Yとを一体化してよい。イエロートナー像を形成する感光体ドラム21Yは、円筒状の導電性基体上に、光導電性感光層を設けたものである。この感光体ドラム21Yの両端には、転写体10との間の押圧力を一定にするために、感光体ドラム21Yと同軸に、転写体10に当接する突当コロ211Yが設けられている。突当コロ211Yが当接する転写体10の当接部10Tは、弾性層12を設けず、突当コロ211Yが直接アルミニウム基体11に当接するよう構成している。また、感光体ドラム21Yの一方の端部には、転写体10の転写体ギヤ10Gに啮合する感光体ギヤ212Yが設けられている。これらにより、感光体ドラム21Yは、転写体10との位置決めがなされ、転写体10に移動する方向に回転駆動される。

【0013】 帯電路22Yは、感光体ドラム21Yに対して一様な電位を与える手段であって、本実施の形態においては、感光体ドラム21Yと接触しながら回転駆動するローラ状のローラ帯電路22Yが用いられている。

【0014】 露光手段23Yは、ローラ帯電路22Yによって一様な電位を与えられた感光体ドラム21Y上に、画像信号（イエロー）に基づいて露光を行い、イエローの画像に対応する静電層像を形成する手段であって、この露光手段23Yとしては、感光体ドラム21Yの軸方向にアレライズ光線素子を配列したLEDと結像素子（商品名：セルフォックレンズ）とから構成されるもの、あるいは、レーザ光素子などが用いられる。

【0015】 現像手段24Yは、現像剤であるイエロー電層像を反転現像して、イエロートナー像を形成する手段である。本実施の形態の現像手段24Yにおいては、現像剤24Y内に収容されているイエロートナーを、現像部材241Yにより供給した後、矢示の方向に回転する表面が弾性（スポンジ）のトナー供給ローラ242Yにより、現像スリーブ243Yへ供給する。このとき、薄層形成部材244Yにより現像スリーブ243Y上のイエロートナーを均一の薄膜とする。現像手段24Yの現像作用に際しては、矢示の方向に回転する現像スリーブ243Yに対し、直流あるいは交流を加えた現像バイアスが印加され、現像手段24Yの収容する一成分又は二成分現像剤によるジャンピング現象が行われて、接地されている感光体ドラム21Yに対して、トナーと同極性の直流成分と交流成分とを重ねたバイアスを印加し、非接触の反転現像が行われる。なお、現像スリーブ243Yの画像領域外の両端部に設けられた図示しない突当コロが、感光体ドラム21Yに当接することにより、現像スリーブ243Yと感光体ドラム21

Yとを非接触に係留する。なお、非接触現像ではなく、接触現像を用いることもできる。

【0016】 感光体ドラム21Y上に形成されたイエローのトナー像は、突当コロ212Yにより位置決めされ、転写体10と接触し、トナーと逆極性のバイアス電圧の印加された転写体10により、順次、転写体10上の転写材あるいは転写体10そのものに直接転写される。【0017】 クリーニング手段25Yは、イエロートナー像が転写体10上の転写材あるいは転写体10に転写された後に、感光体ドラム21Y上に残留したイエロートナーを、感光体ドラム10上から除去するための手段であって、本実施の形態においては、クリーニングブレード25Yが感光体ドラム21Yに接触することにより、残留トナーの除去を行っている。

【0018】 このようにして、面像形成ユニット20Yにより、帯電、露光、反転現像の行程により形成された画像信号（イエロー）に対応したイエロートナー像は、転写体10上の転写材あるいは転写体10そのものに直接転写される。

【0019】 その他の面像形成ユニット20M、20C、20Kも同様に、それぞれ感光体ドラム21M、21C、21K上に、画像信号（マゼンタ）に対応したマゼンタトナー像、画像信号（シアン）に対応したシアントナー像、画像信号（黒）に対応した黒トナー像が並列処理的に、同層をとりながら形成される。そして、各面像形成ユニット20Y、20M、20C、20Kの各感光体ドラム21Y、21M、21C、21K上に形成されたトナー像は、順次、後述する転写バイアスを印加して転写体10上の転写材あるいは転写体10そのものに直接転写され、トナー像が重ね合わされる。

【0020】 （実施の形態1） 請求項1に係わる発明の実施の形態を図1によって説明する。

【0021】 本実施形態の装置の備える転写体10は前記の転写体10Aであって、その周囲には、転写体Pの先端を把持するためのグリッパ14、吸着手段17、分離手段18が設けられている。吸着手段である吸着ローラ17は接離可能であり、グリッパ14により先端を把持された転写体Pを転写体10A上に密着させる手段である。この吸着ローラ17は、矢示の如く、転写体10Aに対して当接時逆回転し、転写体10Aの回転に伴って移動して先端を把持された転写体Pを、転写体10Aに押しつけるながら、静電的に転写体10A上に密着させる。分離手段である分離爪18は、保持された転写体Pを転写体10A上から分離を行う手段である。この分離爪18は、矢示の如く、転写体10Aに対して、接離可能に設けられており、転写体Pの分離を行うときのみ転写体10Aに密着する。

【0022】 以下前記の装置による面像形成のプロセスについて説明する。

【0023】 面像形成のスタートによる不図示の駆動モータの動力により、前記の転写体10Aが時計方向に、従って前記の各面像形成ユニット20の感光体ドラム21が反時計方向にそれぞれ回転される。

【0024】 前記の各露光手段23に原稿画像の色別の画像信号が予め設定されたタイミングに従って順次入力されて各面像形成ユニット20の感光体ドラム21上に色別の各トナー像が形成される。

【0025】 一方これに並行して給紙カセットCAから転写体Pの給紙が開始される。すなわち転写体Pは給紙ローラ11の作用により供給手段であるタイミングローラ12へと送られ、タイミングローラ13は所定のタイミングで転写体Pを送り出す。タイミングローラ12により送り出された転写体Pは転写体10Aに突き当たるよう進入し、転写体10Aのグリッパ14によりその先端を把持されて転写体10Aと共に矢示方向（時計方向）に回転される。

【0026】 転写体Pは転写体10Aに当接状態とされた後逆回転する吸着ローラ17によりドラム面に押し付けられながら静電的にドラム面に密着し、ドラム面より離間している分離爪18の下を通過して画像の転写域へと給紙される。当接状態は転写体Pの後端通過直後となる。

【0027】 前記の各トナー像の転写に当たっては、転写体10Aの基体に共通のバイアス電圧としてトナー（本実施形態においてはマゼンタ色）の逆極性である+1000Vのバイアス電圧が印加され、一方各面像形成ユニット20の感光体ドラム21に対してはそれぞれ形成するトナー像の転写のタイミングに感光体ドラム21Yに対し 0V、感光体ドラム21Mに対し -100V、感光体ドラム21Cに対し -200V、感光体ドラム21Kに対し -300V

と各トナー像の重ね合わせの度合いが増えるに従って、先に言うように重ね合わせの度合いが増えるに従って、先に面像形成と転写体Pへの転写がなされる感光体ドラムから次第に高くなる転写バイアス電圧が印加される。

【0028】 従って各感光体ドラム21に対する電圧を0Vとした時の静電電圧を-700V、白地電圧を-1000Vに設定したとすれば、各感光体ドラム21帯電電位V_sはそれぞれ-700V、-800V、-900V、-1000V、露光による白地部分の電位V_wがそれぞれ-1000V、-200V、-300Vおよび400Vと変化する。その結果反転現象された転写を有するマゼンタ（M）、シアン（C）および黒（K）の各トナー像は重ね合わせの度合いが多くなるにもかかわらず、転写体Pに対し最初に転写が多くなるイエロー（Y）のトナー像と同程度の90%前後の高い転写率をもって転写されることとなり、従ってカラーバランスの正しい画像が形成されることとなる。

【0029】 転写体10Aの1回転によりY、M、

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C、K各色のトナー像の転写を終えた転写紙Pは前記の分離爪18のドラム面への当接によりドラム面より分離され、加熱ローラ4と圧着ローラ41により挟持加熱されてトナーを溶着し排紙ローラ対3を介して排紙トレイ上に排出され、一方転写紙Pを分離した転写ドラム10Aはクリーニング手段16のフアーブラシ161のドラム面への摩擦回転により清掃されて画像形成のプロセスを終了する。

【0030】なお、転写紙Pの転写ドラム面からの分離性を向上させるために、分離爪18の上流部にコロナ放電器により転写紙PにAC除電を行うことが効果的である。

【0031】実施形態2) 請求項2に係わる発明の実施形態を図2によって説明する。

【0032】本実施形態の装置の備える転写体10は前記の中間転写ドラム10Bであって、その周囲には転写紙Pを荷電するための紙帯電ブラシ15、転写器17、A、除電器17B、分離爪18が設けられている。紙帯電ブラシ15は給紙された転写紙Pを中間転写ドラム10Bに密着するべく給紙時にのみ中間転写ドラム10Bに接して帯電させる手段であり、分離爪18はトナー像を転写した転写紙Pをドラム面より分離する手段であってドラム面に対し接離可能に設けられていて、転写紙Pを分離するときにのみドラム面に当接される。

【0033】以下前記の装置による画像形成のプロセスについて説明する。

【0034】画像記録のスタートによる不図示の駆動モータの動力により前記の中間転写ドラム10Bが時計方向に、従って前記の各画像形成ユニット200の感光体ドラム21が反時計方向にそれぞれ回転される。

【0035】前記の各露光手段に原稿画像の各色の画像信号が予め設定されたタイミングに従って順次入力され、各画像形成ユニット200の感光体ドラム21上に色別の各トナー像が形成される。

【0036】前記の各感光体ドラム21上の各トナー像は中間転写ドラム10Bの周囲に順次重ね合わせられて転写されてカラートナー像となり、一方転写紙Pは排紙ローラ対3を介して排紙トレイ上に排出される。一方転写紙Pを分離した中間転写ドラム10Bはクリーニング手段16のフアーブラシ161のドラム面への摩擦回転により清掃されて画像形成のプロセスを終了する。

【0037】前記の各トナー像の転写に当たっては、中間転写ドラム10Bの基体には印加するバイアス電圧を500Vとされ、一方画像形成ユニット200の感光体ドラム21に対してはそれぞれ形成するトナー像の転写のタイミングに

感光体ドラム21Yに対し -300V
感光体ドラム21Mに対し -450V
感光体ドラム21Cに対し -500V
感光体ドラム21Kに対し -550V
と各トナー像を重ね合わせる度が増えるに従って、先に

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画像形成と中間転写ドラム10Bへの転写がなされる感光体ドラムから次第に高くなる転写バイアス電圧が印加される。

【0038】従って各感光体ドラム21に対する基体電圧0Vとした時の帯電電圧を-700V、白地電位を-100Vに設定したとすれば、各感光体ドラム21の帯電電位Vはそれぞれ-1500V、-1650V、-1700Vおよび-1750V、露光による白地部分の電位Vがそれぞれ-900V、-1050V、-1100Vおよび-1150Vと変化し、その結果反転現象が

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び黒(K)の各トナー像は重ね合わせの度数が多くなるにもかかわらず中間転写ドラム10Bに対し最初転写がなされるイエロー(Y)のトナー像と同程度の90%前後の高い転写率をもって転写されることとなり、従ってカラバランスの正しいトナー像が中間転写ドラム10B上に形成されることとなる。

【0039】一方これに並行して給紙カセットCAから転写紙Pの給紙が開始され、転写紙Pは給紙ローラ1の作動により供給手段であるタイミングローラ2へと送られ、タイミングローラ2は所定のタイミングで転写紙Pを送り出す。タイミングローラ2により送り出された転写紙Pは中間転写ドラム10Bに突き当たり、中間転写ドラム10Bに密着するべく給紙時にのみ中間転写ドラム10Bに接して帯電させる手段であり、分離爪18はトナー像を転写した転写紙Pをドラム面より分離する手段であってドラム面に対し接離可能に設けられていて、転写紙Pを分離するときにのみドラム面に当接される。

【0033】以下前記の装置による画像形成のプロセスについて説明する。

【0034】画像記録のスタートによる不図示の駆動モータの動力により前記の中間転写ドラム10Bが時計方向に、従って前記の各画像形成ユニット200の感光体ドラム21が反時計方向にそれぞれ回転される。

【0035】前記の各露光手段に原稿画像の各色の画像信号が予め設定されたタイミングに従って順次入力され、各画像形成ユニット200の感光体ドラム21上に色別の各トナー像が形成される。

【0036】前記の各感光体ドラム21上の各トナー像は中間転写ドラム10Bの周囲に順次重ね合わせられて転写されてカラートナー像となり、一方転写紙Pは排紙ローラ対3を介して排紙トレイ上に排出される。一方転写紙Pを分離した中間転写ドラム10Bはクリーニング手段16のフアーブラシ161のドラム面への摩擦回転により清掃されて画像形成のプロセスを終了する。

【0037】前記の各トナー像の転写に当たっては、中間転写ドラム10Bの基体には印加するバイアス電圧を500Vとされ、一方画像形成ユニット200の感光体ドラム21に対してはそれぞれ形成するトナー像の転写のタイミングに

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【0043】前記の中間転写ドラム10Bの周囲には、タイミングローラ対2から供給される転写紙Pの先端を把持するためのグリッパ14、転写紙Pを帯電するための紙帯電ブラシ15、転写紙Pに中間転写ドラム10B上のトナー像を転写するための裏面転写器17A、転写紙Pをドラム面より分離するための除電器17Bならびに分離爪18ならびにドラム上の残留トナーを除去するためのクリーニング手段16が設けられている。前記のグリッパ14、紙帯電ブラシ15、分離爪18およびクリーニング手段16のフアーブラシ161はそれぞれ使用時のみドラム面に対し圧着するよう接離可能とされている。

【0044】以下前記の装置による両面画像形成のプロセスについて説明する。原稿画像としては別体の画像取得装置により読み取られた原稿表裏の各色別の画像データがメモリに記憶し格納されている。

【0045】画像記録のスタートによる不図示の駆動モータの動力により中間転写ドラム10Bが時計方向に、同時に前記の各画像形成ユニット200の感光体ドラム21が反時計方向にそれぞれ回転される。

【0046】前記のメモリより先ず原稿表裏の各色別の画像信号が予め設定されたタイミングに従って順次出力され、各画像形成ユニット200の感光体ドラム21上に色別の各トナー像が形成され、順次中間転写ドラム10Bの両面に転写されて原稿表裏のカラートナー像が重ね合わされて形成される。この間前記のグリッパ14はドラム面に密着され、給紙電圧15、分離爪18はドラム面より順次位置に保たれる。

【0047】前記の各トナー像の中間転写ドラム10Bへの転写に当たっては、中間転写ドラム10Bの基体には印加するバイアス電圧を0Vとして直接接地され、一方各画像形成ユニット200の感光体ドラム21に対してはそれぞれ形成するトナー像の転写のタイミングに

感光体ドラム21Yに対し -800V
感光体ドラム21Mに対し -950V
感光体ドラム21Cに対し -1000V
感光体ドラム21Kに対し -1050V
と各トナー像を重ね合わせる度が増えるに従って、先に画像形成と中間転写ドラム10Bへの転写がなされる感光体ドラムから次第に高くなる転写バイアス電圧が印加される。

【0048】従って各感光体ドラム21に対する基体電圧0Vとした時の帯電電圧を-700V、白地電位を-100Vに設定したとすれば、各感光体ドラム21の帯電電位Vはそれぞれ-1500V、-1650V、-1700Vおよび-1750V、露光による白地部分の電位Vがそれぞれ-900V、-1050V、-1100Vおよび-1150V程度と成り、その結果反転現象が

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び黒(K)の各トナー像は重ね合わせの度数が多くなるにもかかわらず中間転写ドラム10Bに対し最初転写がなされるイエロー(Y)のトナー像と同程度の90%前後の高い転写率をもって転写されることとなり、従ってカラバランスの正しいトナー像が中間転写ドラム10B上に形成されることとなる。

【0039】一方これに並行して給紙カセットCAから転写紙Pの給紙が開始され、転写紙Pは給紙ローラ1の作動により供給手段であるタイミングローラ2へと送られ、タイミングローラ2は所定のタイミングで転写紙Pを送り出す。タイミングローラ2により送り出された転写紙Pは中間転写ドラム10Bに突き当たり、中間転写ドラム10Bに密着するべく給紙時にのみ中間転写ドラム10Bに接して帯電させる手段であり、分離爪18はトナー像を転写した転写紙Pをドラム面より分離する手段であってドラム面に対し接離可能に設けられていて、転写紙Pを分離するときにのみドラム面に当接される。

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および黒(K)の各トナー像は重ね合わせの度数が多くなるにもかかわらず中間転写ドラム10Bに対しイエロー(Y)のトナー像と同程度の90%前後の高い転写率をもって転写されることとなり、従ってカラバランスの正しいカラートナー像が中間転写ドラム10B上に形成される。

【0049】トナー像の転写を終えた各感光体ドラムはクリーニングローラ対25C'の摩擦により残留トナーを除去して清掃される。

【0050】次いで原稿表裏の各色別の各画像信号が順次出力されて各画像形成ユニットの感光体ドラム上に色別の各トナー像の形成が開始され、さらに並行して給紙力の各トナー像の形成が開始され、給紙ローラ1の作動により、給紙カセットCA内から搬出され、中間転写ドラム10Bへ転写紙Pを供給する供給手段であるタイミングローラ対2へと送られる。タイミングローラ対2は所定のタイミングで転写紙Pを送り出す。タイミングローラ対2により送り出された転写紙Pは、中間転写ドラム10Bに突き当たり、中間転写ドラム10Bに密着するべく給紙時にのみ中間転写ドラム10Bに接して帯電させる手段であり、分離爪18はトナー像を転写した転写紙Pをドラム面より分離する手段であってドラム面に対し接離可能に設けられていて、転写紙Pを分離するときにのみドラム面に当接される。

【0051】すなわち転写紙Pは、給紙ローラ1の作動により、給紙カセットCA内から搬出され、中間転写ドラム10Bへ転写紙Pを供給する供給手段であるタイミングローラ対2へと送られる。タイミングローラ対2は所定のタイミングで転写紙Pを送り出す。タイミングローラ対2により送り出された転写紙Pは、中間転写ドラム10Bに突き当たり、中間転写ドラム10Bに密着するべく給紙時にのみ中間転写ドラム10Bに接して帯電させる手段であり、分離爪18はトナー像を転写した転写紙Pをドラム面より分離する手段であってドラム面に対し接離可能に設けられていて、転写紙Pを分離するときにのみドラム面に当接される。

【0052】前記の各トナー像の転写に当たっては、中間転写ドラム10Bの基体には印加するバイアス電圧を0Vとして直接接地され、一方各画像形成ユニット200の感光体ドラム21に対してはそれぞれ形成するトナー像の転写のタイミングに

感光体ドラム21Yに対し -1000V
感光体ドラム21Mに対し -1100V
感光体ドラム21Cに対し -1200V
感光体ドラム21Kに対し -1300V
と各トナー像を重ね合わせる度が増えるに従って、先に転写紙Pへの転写がなされる感光体ドラムから

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および黒(K)の各トナー像は重ね合わせの度数が多くなるにもかかわらず中間転写ドラム10Bに対しイエロー(Y)のトナー像と同程度の90%前後の高い転写率をもって転写されることとなり、従ってカラバランスの正しいカラートナー像が中間転写ドラム10B上に形成される。

【0049】トナー像の転写を終えた各感光体ドラムはクリーニングローラ対25C'の摩擦により残留トナーを除去して清掃される。

【0050】次いで原稿表裏の各色別の各画像信号が順次出力されて各画像形成ユニットの感光体ドラム上に色別の各トナー像の形成が開始され、さらに並行して給紙力の各トナー像の形成が開始され、給紙ローラ1の作動により、給紙カセットCA内から搬出され、中間転写ドラム10Bへ転写紙Pを供給する供給手段であるタイミングローラ対2へと送られる。タイミングローラ対2は所定のタイミングで転写紙Pを送り出す。タイミングローラ対2により送り出された転写紙Pは、中間転写ドラム10Bに突き当たり、中間転写ドラム10Bに密着するべく給紙時にのみ中間転写ドラム10Bに接して帯電させる手段であり、分離爪18はトナー像を転写した転写紙Pをドラム面より分離する手段であってドラム面に対し接離可能に設けられていて、転写紙Pを分離するときにのみドラム面に当接される。

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11

ら次第に高くなる転写バイアス電圧が印加される。転写バイアス電圧は、転写紙を介していることから転写紙を介さない場合より高く設定する。

【0053】従って各感光体ドラム21に対する基体を0Vとした時の帯電電圧を-700V、白地電圧を-100Vに設定したとすれば、各感光体ドラム21の転写時の帯電電圧はそれぞれ-1700V、-1800V、-1900Vおよび-2000V、露光による白地部分の電位Vwがそれぞれ-1100V、-1200V、-1300Vおよび-1400V程度となつて、その結果反転現像された負極性を有するマゼンタ(M)、シアン(C)および黒(K)の各トナー像は重ね合わせの度数が多くなるにもかかわらず転写紙Pに対し最初に転写がなされるイエロー(Y)のトナー像と同程度の90%前後の高い転写率をもって転写されてカラーバランスの正しいカラートナー像が転写される。

【0054】表面トナー像を転写された転写紙Pはさらに中間転写ドラム10Bの3回転目において、裏面コロナ転写器17Aにより+1.5kV程度の高い転写バイアス電圧に相当する電圧が付与されて、紙の裏面に中間転写ドラム10Bの保持する原稿表面のカラートナー像を先に転写した原稿表面のカラートナー像に同期して転写紙Pの下面に一括して転写された後、除電器17B(裏面)の作用により中間転写ドラム10B上から分離され、さらに、定着手段40へと搬送される。定着手段40において、上下一対の加熱ローラ41により加熱、圧着され表裏両面のカラートナー像が転写紙P上に定着された後、転写紙Pは排紙ローラ対r3により排紙トレイ上へ排出される。

【0056】一方転写紙Pを分離した中間転写ドラム10Bはクリーニング手段16のフワーブランチ161のドラム面への指接回転により清掃されて画像形成のプロセ

12

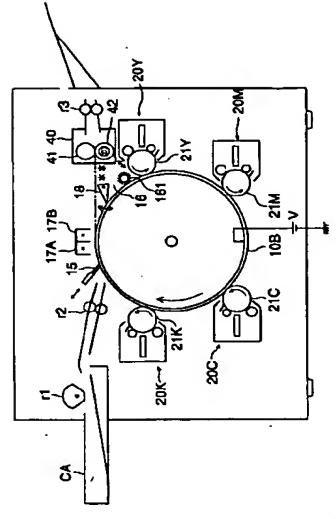
スを終了する。

【0056】本発明により、いわゆるタンデム方式のカラー画像形成手段によってもカラーバランスの優れた高品位のカラー画像が形成されることとなり、その装置は請求項1により直接転写方式、また請求項2により間接転写方式、さらに請求項3により両面転写方式の各カラー画像形成装置として提供されることとなった。

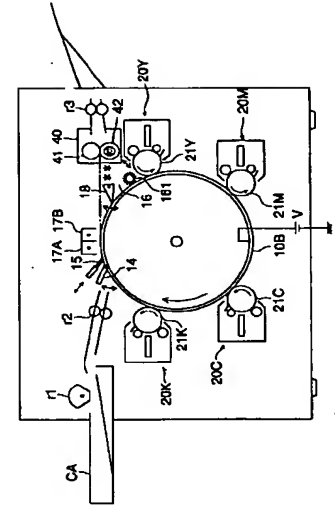
【図面の簡単な説明】
【図1】本発明のカラー画像形成装置(その一)の断面構成図。
【図2】本発明のカラー画像形成装置(その二)の断面構成図。
【図3】本発明のカラー画像形成装置(その三)の断面構成図。
【図4】画像形成ユニットの断面構成図。
【図5】転写ドラムと画像形成ユニットとを示す斜視図。

- 【符号の説明】
- 10 A 転写体(転写ドラム)
 - 10 B 中間転写体(中間転写ドラム)
 - 14 グリッパ
 - 15 紙帯電ブラシ
 - 16 クリーニング手段
 - 17 吸着ローラ(吸着手段)
 - 17 A (裏面) (コロナ) 転写器
 - 17 B (コロナ) 除電器
 - 18 分離爪
 - 20 画像形成ユニット
 - 21 感光体ドラム
 - 22 帯電手段
 - 23 露光手段
 - 24 現像手段

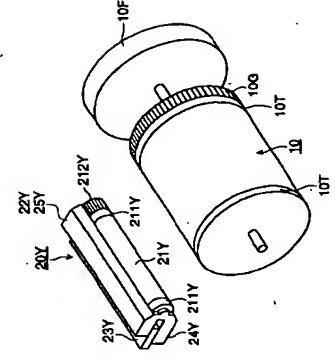
【図2】



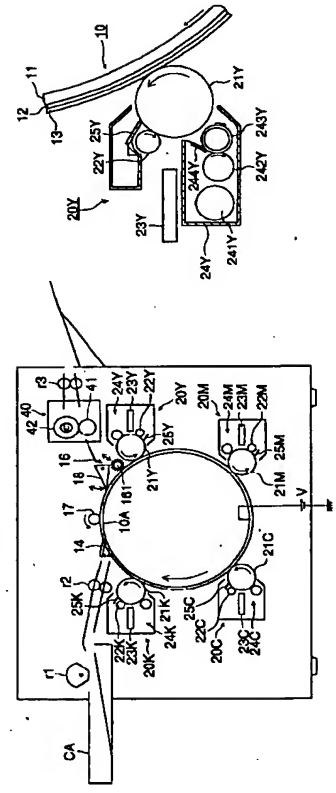
【図3】



【図5】



【図4】



f.

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : KONICA CORP

(22)Date of filing : 18.03.1997

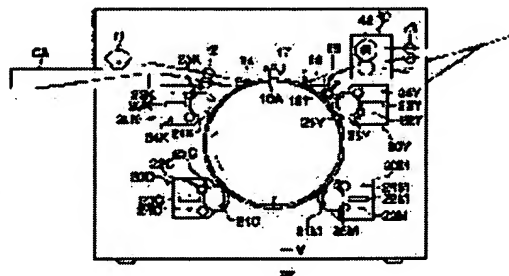
(72)Inventor : HANEDA SATORU

(54) COLOR IMAGE FORMING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To transfer respective single-color toner images at the same transfer rate, at the time of superimposing/transferring the respective single-color toner images formed on plural image forming bodies on/to a transfer material, so as to obtain a color toner image.

SOLUTION: A transfer drum 10A and the respective photoreceptor drums 21 (21Y, 21M, 21C and 21K) of image forming units 20 (20Y, 20M, 20C and 20K) are electrically insulated from each other and the respective singlecolor toner images formed on the drums 21 are transferred to a transfer paper wound on the periphery of the transfer drum 110A. At this time, a bias voltage of +1000 V which has a polarity opposite to that of toner is applied to the transfer drum 10A. At the timing of transferring the respective toner images, a transfer bias voltage which becomes gradually higher than that of the photoreceptor drum used for the first transfer, as the number of superimposing times is increased, is applied, for instance, 0 V is for the drum 21Y, -100 V is for the drum 21M, -200 V is for the drum 21C and -300 V is for the drum 21K. Thus, the same transfer rate is obtained.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision
of rejection]

[Date of requesting appeal against examiner's
decision of rejection]

[Date of extinction of right]

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JAPANESE [JP,10-260563,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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CLAIMS

[Claim(s)]

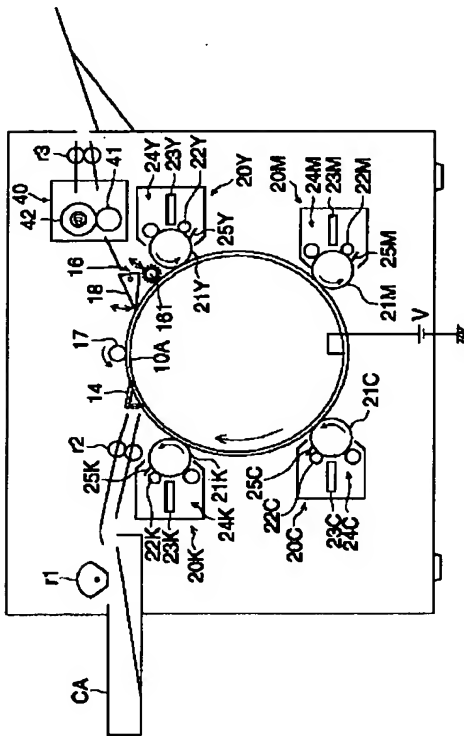
[Claim 1] The color-picture formation equipment characterized by to impress bias voltage which is different in the base of the aforementioned image-formation object in the color-picture formation equipment which is equipped with the following, is made to pile up each other's toner image formed on the aforementioned image-formation object one by one on the imprint material held at the aforementioned imprint means, and forms a color toner image while impressing bias voltage common to the aforementioned imprint means. 4 sets of image formation units which equip the circumference of an image formation object with a development means and an exposure means, and form a toner image on the aforementioned image formation object An imprint means by which the 4 aforementioned sets of image formation units are arranged around, imprint the toner image formed on the aforementioned image formation object, and form a color toner image

[Claim 2] The color-picture formation equipment which carries out [impressing bias voltage which is different in the base of the aforementioned image-formation object, and] as the feature in the color-picture formation equipment which imprints collectively the color toner image which was equipped with the following, was made to pile up mutually one by one and was formed on the aforementioned imprint means on the imprint material held at the aforementioned imprint means while impressing bias voltage common to the aforementioned imprint means. 4 sets of image formation units which equip the circumference of an image formation object with a development means and an exposure means, and form a toner image on the aforementioned image formation object An imprint means by which the 4 aforementioned sets of image formation units are arranged around, imprint the toner image formed on the aforementioned image formation object, and form a color toner image

[Claim 3] Have the following and the color toner image which was made to pile up mutually one by one and was formed on the aforementioned imprint means is collectively imprinted to one field of the imprint material held at the aforementioned imprint means. In the color picture formation equipment which is made to put each other's toner image formed on the aforementioned image formation object one by one on the field of another side of the aforementioned imprint material, imprints, and forms a color toner image, while impressing bias voltage common to the aforementioned imprint means Color picture formation equipment characterized by impressing bias voltage which is different in the base of the aforementioned image formation object. 4 sets of image formation units which equip the circumference of an image formation object with a development means and an exposure means, and form a toner image on the aforementioned image formation object An imprint means by which the 4 aforementioned sets of image formation units are arranged around, imprint the toner image formed on the aforementioned image formation object, and form a color toner image

[Translation done.]

Drawing selection [Representative drawing] 



[Translation done.]

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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the color picture formation equipment of the electrophotography method which is made to pile up each other's toner image formed on two or more image formation objects, and forms a color picture.

[0002]

[Description of the Prior Art] Although various color picture formation equipments of an electrophotography method are proposed, promising ** of the tandem system (method which uses two or more photo conductors) as a color system which has broad correspondence in print speed or a future information society which can carry out parallel processing of the four colors simultaneously is carried out.

[0003] As a method of forming the multicolor color picture by this tandem system, around an image formation object, a development means, The toner image of the monochrome formed in each image formation object of two or more image formation units which have arranged the exposure means etc. Research of the method which piles up on a middle imprint object, forms and bundles up a color picture, and is imprinted on imprint material, or the method which imprints each toner image of the aforementioned monochrome one by one on direct imprint material, and forms a color picture is made.

[0004]

[Problem(s) to be Solved by the Invention] However, it was unavoidable that the color picture which it was not avoided that the rate of an imprint falls as the toner image on an image formation object was piled up also to any of a middle imprint object or imprint material, therefore was formed of the aforementioned all directions formula has a difficulty in color balance.

[0005] this invention is imprinted by the sequence and the frequency of superposition with the high rate of an imprint which was altogether fixed regardless of the toner image on an image formation object, as a result of solving and improving this point, and it aims at offer of the color picture formation equipment which can form the color picture which was excellent in color balance with it.

[0006]

[Means for Solving the Problem] 4 sets of image formation units which the above-mentioned purpose equips the circumference of an image formation object with a development means and an exposure means, and form a toner image on the aforementioned image formation object, The 4 aforementioned sets of image formation units are arranged around, and the toner image formed on the aforementioned image formation object is imprinted. In the color picture formation equipment which has an imprint means to form a color toner image, is made to pile up each other's toner image formed on the aforementioned image formation object one by one on the imprint material held at the aforementioned imprint means, and forms a color toner image

the color picture formation equipment (invention concerning a claim 1) characterized by impressing bias voltage which is different in the base of the aforementioned image formation object while impressing bias voltage common to the aforementioned imprint means -- and 4 sets of image formation units which equip the circumference of an image formation object with a development means and an exposure means, and form a toner image on the aforementioned image formation object, The 4 aforementioned sets of image formation units are arranged around, and the toner image formed on the aforementioned image formation object is imprinted. In the color picture formation equipment which imprints collectively the color toner image which had an imprint means to form a color toner image, was made to pile up mutually one by one and was formed on the aforementioned imprint means on the imprint material held at the aforementioned imprint means the color picture formation equipment (invention concerning a claim 2) characterized by impressing bias voltage which is different in the base of the aforementioned image formation object while impressing bias voltage common to the aforementioned imprint means -- and 4 sets of image formation units which equip the circumference of an image formation object with a development means and an exposure means, and form a toner image on the aforementioned image formation object, The 4 aforementioned sets of image formation units are arranged around, and the toner image formed on the aforementioned image formation object is imprinted. Have an imprint means to form a color toner image, and the color toner image which was made to pile up mutually one by one and was formed on the aforementioned imprint means is collectively imprinted to one field of the imprint material held at the aforementioned imprint means. In the color picture formation equipment which is made to put each other's toner image formed on the aforementioned image formation object one by one on the field of another side of the aforementioned imprint material, imprints, and forms a color toner image, while impressing bias voltage common to the aforementioned imprint means It is attained by the color picture formation equipment (invention concerning a claim 3) characterized by impressing bias voltage which is different in the base of the aforementioned image formation object.

[0007]

[Embodiments of the Invention] Each color picture formation equipment of this invention is equipped with drum-like imprint object 10A or middle imprint object 10B (it names generically below and considers as the imprint object 10) for all as show drawing 1 or drawing 3, and yellow (Y), a Magenta (M), cyanogen (C), and each black (K) image formation unit 20 are arranged by the peripheral surface.

[0008] As the aforementioned imprint object 10 is shown in drawing 4, the mold-release characteristic film layer 13 for separation of 50-500 micrometers in thickness, electric resistance 106 - 1014 ohm-cm is both further formed on it for example, on the conductive aluminum base 11 with the conductive elastic layer 12 of 1-10mm in thickness, electric resistance 102 - 106 ohm-cm.

[0009] The aforementioned imprint object 10 is electrically made the insulating state by measures, such as making width of face of the mold-release characteristic film layer 13 of high resistance, or the photosensitive layer of an image formation object larger than the width of face of the conductive elastic layer 12 of the imprint object 10, as opposed to the image formation object of the shape of a drum with which each aforementioned image formation unit 20 is equipped, and is enabling impression of the imprint bias voltage which became independent to each image formation object by it.
 [0010] The aforementioned imprint object 10 is supported to revolve by the bearing which is not illustrated to the front face and rear panel which is not illustrated, and installs the axis of rotation of the imprint object 10 out of a rear panel further, and flywheel 10F as shown at the nose of cam at drawing 5 are prepared. These flywheel 10F do not have vibration of rotation of the imprint object 10, and in order to carry out smoothly, they give an inertia force.

[0011] Since the colors of the toner image formed, respectively only differ and 4 sets of image

formation units 20Y, 20M, 20C, and 20K are carrying out the same composition, image formation unit 20Y is made into an example, and they explain it.

[0012] the circumference of photo conductor drum 21Y which is an image formation object as image formation unit 20Y is shown in drawing 4 -- image formation object electrification means 22Y (the following -- only -- electrification means 22Y --) or it is called electrification machine 22Y -- exposure means 23Y, development means 24Y, and image formation object cleaning means 25Y (the following -- only -- cleaning means 25Y --) or -- cleaning-blade 25Y -- saying -- it arranges and a yellow toner image is formed on photo conductor drum 21Y Moreover, what is necessary is to unify photo conductor drum 21Y and development means 24Y at least in addition to this in the gestalt of this operation, as a process cartridge although photo conductor drum 21Y, electrification means 22Y, development means 24Y, and cleaning means 25Y are unified among this image formation unit 20Y and it is removable. Photo conductor drum 21Y which forms a yellow toner image prepares a photoconductivity photosensitive layer on a conductive cylinder-like base. In order to make regularity the press force between the imprint objects 10, **** koro 211Y which contacts the imprint object 10 at photo conductor drum 21Y and the same axle is prepared in the ends of this photo conductor drum 21Y. Without forming the elastic layer 12, contact section 10T of the imprint object 10 with which **** koro 211Y contacts are constituted so that **** koro 211Y may contact the direct aluminum base 11. Moreover, photo conductor gear 212Y engaged to imprint object gear 10G of the imprint object 10 is prepared in one edge of photo conductor drum 21Y. Positioning with the imprint object 10 is made by these, and the rotation drive of the photo conductor drum 21Y is carried out in the direction which follows on the imprint object 10.

[0013] Electrification means 22Y is a means to give uniform potential to photo conductor drum 21Y, and in the gestalt of this operation, roller electrification machine 22Y of the shape of a roller which carries out follower rotation is used, contacting photo conductor drum 21Y.

[0014] Exposure means 23Y on photo conductor drum 21Y which was able to give uniform potential by roller electrification machine 22Y It is a means to be exposed based on a picture signal (yellow) and to form the electrostatic latent image corresponding to the picture of yellow. as this exposure means 23Y The thing which consists of a Light Emitting Diode which arranged the light emitting device in the shape of an array, and an image formation element (tradename; selfoc lens), or a laser beam study system is used for the shaft orientations of photo conductor drum 21Y.

[0015] Development means 24Y is a means to hold the yellow toner which is a developer, to carry out reversal development of the electrostatic latent image formed on photo conductor drum 21Y, and to form a yellow toner image. the yellow toner held in development means 24Y in development means 24Y of the gestalt of this operation -- stirring -- a member -- after stirring by 241Y, the front face rotated in the direction of **** supplies development sleeve 243Y by toner feed roller 242Y of elasticity (sponge) this time -- thin layer formation -- a member -- let the yellow toner on development sleeve 243Y be a uniform thin layer by 244Y As opposed to development sleeve 243Y which rotates in the direction of **** on the occasion of a development operation of development means 24Y As opposed to photo conductor drum 21Y which a direct current or the development bias which added the alternating current further is impressed, and jumping development by one component or two component developer which development means 24Y holds is performed, and is grounded The bias which superimposed the toner, the dc component of like-pole nature, and the alternating current component is impressed, and non-contact reversal development is performed. In addition, the **** koro which was prepared in the both ends outside the picture field of development sleeve 243Y and which is not illustrated is maintaining development sleeve 243Y and photo conductor drum 21Y at non-contact by contacting photo conductor drum 21Y. In addition, not non-contact development but contact development can also be used.

[0016] The toner image of the yellow formed on photo conductor drum 21Y is positioned by

**** koro 212Y, contacts the imprint object 10, and is directly imprinted by the imprint material on the imprint object 10, or imprint object 10 itself one by one with the imprint object 10 with which the bias voltage of a toner and reversed polarity is impressed.

[0017] After a yellow toner image is imprinted by the imprint material or the imprint object 10 on the imprint object 10, cleaning means 25Y is a means for removing the yellow toner which remained on photo conductor drum 21Y from on the photo conductor drum 10, and when cleaning-blade 25Y ****s to photo conductor drum 21Y, it is removing the remains toner in the gestalt of this operation.

[0018] Thus, the yellow toner image corresponding to the picture signal (yellow) formed of the distance of electrification, exposure, and reversal development is directly imprinted by image formation unit 20Y the imprint material on the imprint object 10, or imprint object 10 itself.

[0019] Similarly, on the photo conductor drums 21M and 21C and 21K, the other image formation units 20M, 20C, and 20K are formed, respectively, while the Magenta toner image corresponding to the picture signal (Magenta), the cyano toner image corresponding to the picture signal (cyanogen), and the black toner image corresponding to the picture signal (black) take a synchronization in parallel processing. And each photo conductor drums 21Y, 21M, and 21C of each image formation units 20Y, 20M, 20C, and 20K and the toner image formed on 21K impress the imprint bias mentioned later one by one, and is directly imprinted by the imprint material on the imprint object 10, or imprint object 10 itself, and a toner image piles it up.

[0020] (Gestalt 1 of operation) Drawing 1 explains the gestalt of implementation of invention concerning a claim 1.

[0021] The imprint object 10 with which the equipment of this operation gestalt is equipped is the aforementioned imprint drum 10A, and the gripper 14 for grasping the nose of cam of a transfer paper P, the adsorption means 17, and the separation means 18 are formed in the circumference. The adsorption roller 17 which is an adsorption means is a means to stick the transfer paper P which it could attach and detach [transfer paper] and had the nose of cam grasped by the gripper 14 on imprint drum 10A. This adsorption roller 17 carries out follower rotation to imprint drum 10A like **** at the time of contact, and it makes electrostatic stick it on imprint drum 10A, forcing on imprint drum 10A the transfer paper P which had the nose of cam where it moves with rotation of imprint drum 10A grasped. The separation presser foot stitch tongue 18 which is a separation means is a means to perform separation for the held transfer paper P from on imprint drum 10A. Like ****, to imprint drum 10A, this separation presser foot stitch tongue 18 is formed possible [attachment and detachment], and only when separating a transfer paper P, it ****s to imprint drum 10A.

[0022] The process of the image formation by above equipment is explained below.

[0023] With the power of the drive motor which is not illustrated according to the start of image recording, the photo conductor drum 21 of each aforementioned image formation unit 20 rotates [the aforementioned imprint drum 10A] counterclockwise according to a clockwise rotation, respectively.

[0024] According to the timing by which the picture signal according to color of a manuscript picture was beforehand set as each aforementioned exposure means 23, it is inputted one by one, and each toner image according to color is formed on the photo conductor drum 21 of each image formation unit 20.

[0025] On the other hand in parallel to this, feeding of a transfer paper P is started from the feed cassette CA. That is, a transfer paper P is sent to timing roller pair r2 which are a supply means by the operation of the feed roller r1, and timing roller pair r2 send out a transfer paper P to predetermined timing. The transfer paper P sent out by timing roller pair r2 advances so that it may run against imprint drum 10A, it has the nose of cam grasped by the gripper 14 of imprint drum 10A, and rotates in the **** direction (clockwise rotation) with imprint drum 10A.

[0026] A transfer paper P is stuck to a drum side electrostatic, being pushed against a drum side with the adsorption roller 17 which was made into the contact state at imprint drum 10A

and which carries out follower rotation, passes through the bottom of the separation presser foot stitch tongue 18 estranged from the drum side, and is fed to the imprint region of a picture. A contact state is maintained to back end passage of a transfer paper P.

[0027] If in charge of the imprint of each aforementioned toner image, the bias voltage of +1000V which are the reversed polarity of a toner (it sets in this operation gestalt and is minus polarity) as common bias voltage is impressed to the base of imprint drum 10A. On the other hand to the photo conductor drum 21 of each image formation unit 20, the timing of an imprint of each toner image to form is received at photo conductor drum 21Y. As opposed to 0V photo conductor drum 21M As opposed to -100V photo conductor drum 21C As opposed to -200V photo conductor drum 21K As the frequency of superposition increases so that it may be called -300V The imprint bias voltage which becomes high gradually is impressed from the photo conductor drum on which the imprint to image formation and a transfer paper P is made previously.

[0028] Therefore, supposing it set the electrification voltage when setting the base to each photo conductor drum 21 to 0V as -700V and sets white potential as -100V Each photo conductor drum 21 electrification potential Vs, respectively -700V, -800V, Potential Vw of White Portion by 900V and -1000V, and Exposure, Respectively - -100V, - Although Frequency of Each Black (K) Toner Image [Magenta (M) and Cyanogen (C) Which Have Negative Polarity by Which Changed with 200V, -300V, and -400V, and Reversal Development was Carried Out as a Result, and] of Superposition Increases It will imprint with the high rate of an imprint around 90% of the same grade as the toner image of yellow (Y) with which an imprint is made by the beginning to a transfer paper P, therefore the right picture of a color-balance will be formed.

[0029] The contact to the drum side of the aforementioned separation presser foot stitch tongue 18 dissociates from a drum side, and fixing equipment 40 is fed with the transfer paper P which finished the imprint of the toner image of Y, M, C, and K each color by one rotation of imprint drum 10A. Fastening heating is carried out with the heating roller 42 and the sticking-by-pressure roller 41, weld a toner, and it is discharged on a delivery tray through delivery roller pair r3. Imprint drum 10A which separated the transfer paper P on the other hand is cleaned by the slide contact rotation to the drum side of the fur brush 161 of the cleaning means 16, and ends the process of image formation.

[0030] In addition, in order to raise the separability from the imprint drum side of a transfer paper P, it is effective to perform AC electric discharge in the upper section of the separation presser foot stitch tongue 18 with a corona discharge vessel at a transfer paper P.

[0031] (Gestalt 2 of operation) Drawing 2 explains the gestalt of implementation of invention concerning a claim 2.

[0032] The imprint object 10 with which the equipment of this operation gestalt is equipped is the aforementioned middle imprint drum 10B, and the paper electrification brush 15 for a transfer paper P being charged, imprint machine 17A, electric discharge machine 17B, and the separation presser foot stitch tongue 18 are formed in the peripheral surface. The paper electrification brush 15 is a means electrify the transfer paper P to which paper was fed in slide contact with middle imprint drum 10B only at the time of feeding to stick to middle imprint drum 10B, and only when the separation presser foot stitch tongue 18 is a means separate the imprint drum P which imprinted the toner image from a drum side, is formed possible [attachment and detachment] to the drum side and a transfer paper P is separated, it is contacted by the drum side.

[0033] The process of the image formation by above equipment is explained below.

[0034] According to a clockwise rotation, the photo conductor drum 21 of each aforementioned image formation unit 20 rotates [the aforementioned middle imprint drum 10B] counterclockwise, respectively with the power of the drive motor which is not illustrated according to the start of image recording.

[0035] According to the timing by which the picture signal according to color of a manuscript

picture was beforehand set as each aforementioned exposure means, it is inputted one by one, and each toner image according to color is formed on the photo conductor drum 21 of each image formation unit 20.

[0036] You make it pile up each of each other's toner image on each aforementioned photo conductor drum 21 one by one on the peripheral surface of middle imprint drum 10B, and it imprints, and considers as a color toner image, and the fur brush 161 of paper electrification brush 14A of the during-this-period above, the separation presser foot stitch tongue 18, and the cleaning means 16 is put on the position which each estranged to the drum side.

[0037] In the imprint of each aforementioned toner image, the base of middle imprint drum 10B is set to +500V in the bias voltage to impress. On the other hand, the photo conductor drum 21 of each image formation unit 20 is received. To the timing of an imprint of the toner image which ***** forms As opposed to photo conductor drum 21Y As opposed to -300V photo conductor drum 21M As opposed to -450V photo conductor drum 21C As opposed to -500V photo conductor drum 21K As the frequency of superposition increases so that it may be called -550V The imprint bias voltage which becomes high gradually is impressed from the photo conductor drum on which the imprint to image formation and middle imprint drum 10B is made previously.

[0038] Therefore, supposing it set the electrification voltage when setting the base to each photo conductor drum 21 to 0V as -700V and sets white potential as -100V The electrification potential Vs of each photo conductor drum 21, respectively -1500V, -1650V, Potential Vw of White Portion by 1700V and -1750V, and Exposure, Respectively - -900V, - Magenta Which Has Negative Polarity by Which Changed with 1050V, -1100V, and -1150V, and Reversal Development was Carried Out as a Result (M), Cyanogen (C) and each black (K) toner image will be imprinted with the high rate of an imprint around 90% of the same grade as the toner image of yellow (Y) with which an imprint is made by the beginning to middle imprint drum 10B although the frequency of superposition increases. Therefore, the right toner image of a color-balance will be formed on middle imprint drum 10B.

[0039] On the other hand in parallel to this, feeding of a transfer paper P is started from the feed cassette CA, a transfer paper P is sent to the timing roller r2 which is a supply means by the operation of the feed roller r1, and the timing roller r2 sends out a transfer paper P to predetermined timing. The transfer paper P sent out with the timing roller r2 is stuck to a drum side, and is fed to an imprint region by the slide contact of the paper electrification brush 15 to which it advanced so that it might dash against middle imprint drum 10B, and it changed into the middle imprint drum 10 and the contact state synchronizing with the transfer paper P, and the voltage of -1.0-2.0kV of a toner and like-pole nature was impressed synchronizing with the picture field of the color toner image on middle imprint drum 10B.

[0040] After the charge which is equivalent to about +1.5kV high imprint bias voltage on the surface of paper in an imprint region with corona-transfer machine 17A was given to the transfer paper P, and the color toner image on middle imprint drum 10B of the undersurface was put in block and imprinting, Depending on the need, the exfoliation operation of the aforementioned separation presser foot stitch tongue 18 made into the slide contact state in the drum side separates into the segregation pan by corona electric discharge machine 17B from a drum side, and fixing equipment 40 is fed. Fastening heating is carried out with the heating roller 42 and the sticking-by-pressure roller 41, a toner is welded, and it is discharged on a delivery tray through the delivery roller r3. Middle imprint drum 10B which separated the transfer paper P on the other hand is cleaned by the slide contact rotation to the drum side of the fur brush 161 of the cleaning means 16, and ends the process of image formation.

[0041] (Form 3 of operation) Drawing 3 explains the form of implementation of invention concerning a claim 3.

[0042] The imprint object 10 with which this operation form is equipped is the aforementioned middle imprint drum 10B. Make it put each of each other's toner image formed of each

aforementioned image formation unit 20 one by one on the drum side of middle imprint drum 10B, and the toner image of a color is formed. It makes it possible to have imprinted this collectively to imprint material, to have laid on top of the imprint material which held each further aforementioned toner image to the drum side directly, and to consider as the toner image of a color.

[0043] Rear-face imprint machine 17A for imprinting the toner image on middle imprint drum 10B to the paper electrification brush 15 for the gripper 14 for grasping the nose of cam of the transfer paper P supplied from timing roller pair r2 around the aforementioned middle imprint drum 10B and a transfer paper P being charged, and a transfer paper P, The cleaning means 16 for removing the remains toner of drum lifting to separation presser-foot-stitch-tongue 18 pan is formed in the electric discharge machine 17B row for separating a transfer paper P from a drum side. Attachment and detachment of the fur brush 161 of the aforementioned gripper 14, the paper electrification brush 15, the separation presser foot stitch tongue 18, and the cleaning means 16 is enabled so that a pressure welding may be carried out to a drum side only at the time of each use.

[0044] The process of the double-sided image formation by above equipment is explained below. The image data according to each color of the manuscript table reverse side read by the picture reader of another object as a manuscript picture is memorized and stored in memory.

[0045] Middle imprint drum 10B rotates and, clockwise, the photo conductor drum 21 of each aforementioned image formation unit 20 rotates counterclockwise simultaneously with the power of the drive motor which is not illustrated according to the start of image recording, respectively.

[0046] From the aforementioned memory, each picture signal according to color on the rear face of a manuscript is first outputted one by one according to the timing set up beforehand, each toner image according to color is formed on the photo conductor drum 21 of each image formation unit 20, the peripheral surface of middle imprint drum 10B imprints one by one, and the color toner image on the rear face of a manuscript is set [it piles it up and] and formed. The gripper 14 of the during-this-period above is buried in a drum side, and the paper electrification machine 15 and the separation presser foot stitch tongue 18 are maintained at the position estranged from the drum side.

[0047] In the imprint to middle imprint drum 10B of each aforementioned toner image The base of middle imprint drum 10B is directly grounded considering the bias voltage to impress as 0V. On the other hand, the photo conductor drum 21 of each image formation unit 20 is received. the timing of the imprint drum of the toner image which ***** forms -- photo conductor drum 21Y -- receiving -- -800V photo conductor drum 21M -- receiving -- -950V photo conductor drum 21C -- receiving -- -1000V photo conductor drum 21K -- receiving -- The imprint bias voltage which becomes high gradually is impressed from the photo conductor drum on which the imprint to image formation and middle imprint drum 10B is made previously as the frequency of the superposition of a toner image increases so that it may be called -1050V.

[0048] Therefore, supposing it set the electrification voltage when setting the base to each photo conductor drum 21 to 0V as -700V and sets white potential as -100V The electrification potential Vs of each photo conductor drum 21, respectively -1500V, -1650V, Potential Vw of White Portion by 1700V and -1750V, and Exposure, Respectively - -900V, - Magenta Which Has Negative Polarity by Which Became 1050V, -1100V, and about -1150V, and Reversal Development was Carried Out as a Result (M), Although the frequency of each black (K) toner image [cyanogen (C) and] of superposition increases It will imprint with the high rate of an imprint around 90% of the same grade as the toner image of yellow (Y) to middle imprint drum 10B, and the right color toner image of a color-balance is formed on middle imprint drum 10B.

[0049] Each photo conductor drum which finished the imprint of a toner image removes a remains toner by the slide contact of cleaning-blade 25C', and is cleaned.

[0050] Subsequently, each picture signal according to color on the front face of a manuscript is

outputted one by one, formation of each toner image according to color is started by photo conductor drum lifting of each image formation unit, and feeding of a transfer paper P is further started from the feed cassette CA in parallel.

[0051] That is, a transfer paper P is taken out out of the feed cassette CA by the operation of the feed roller r1, and is sent to timing roller pair r2 which are a supply means to supply a transfer paper P to middle imprint drum 10B. Timing roller pair r2 send out a transfer paper P to predetermined timing. The transfer paper P sent out by timing roller pair r2 runs against middle imprint object drum 10B, and has the nose of cam grasped by the gripper 14 of middle imprint drum 10B. If the nose of cam of a transfer paper P is grasped with a gripper 14, middle imprint drum 10B will rotate in the direction of ****. Moving with rotation of middle imprint drum 10B, and being pushed against middle imprint drum 10B with the paper electrification brush 15, a transfer paper P is stuck on middle imprint drum 10B electrostatic, and passes the lower part of the separation presser foot stitch tongue 18 estranged to middle imprint drum 10B. Then, the photo conductor drums 21Y, 21M, and 21C of the image formation units 20Y, 20M, 20C, and 20K mentioned above and the toner image formed on 21K are imprinted one by one on the transfer paper P held on middle imprint drum 10B, a toner image piles up on a transfer paper P, and a color toner image is formed. If a color toner image is formed, grasping of the transfer paper P by the gripper 14 will be canceled, and the imprint of the color toner image on the front face of a manuscript to a transfer paper P will be ended by 2 rotation eye of middle imprint drum 10B. In addition, image data is beforehand changed so that the surface picture formed at this time may turn into a mirror image mutually [a rear-face picture] on middle imprint drum 10B.

[0052] In the imprint to the transfer paper P of each aforementioned toner image The base of middle imprint drum 10B is directly grounded considering the bias voltage to impress as 0V. On the other hand, the photo conductor drum 21 of each image formation unit 20 is received. To the timing of an imprint of the toner image which ***** forms As opposed to photo conductor drum 21Y As opposed to -1000V photo conductor drum 21M As opposed to -1100V photo conductor drum 21C As opposed to -1200V photo conductor drum 21K As the frequency of the superposition of a toner image increases so that it may be called -1300V The imprint bias voltage which becomes high gradually is impressed from the photo conductor drum on which the imprint to a transfer paper P is made previously. Since the transfer paper is minded, imprint bias voltage is set up more highly than the case where a transfer paper is not minded.

[0053] Therefore, supposing it set the electrification voltage when setting the base to each photo conductor drum 21 to 0V as -700V and sets white potential as -100V The electrification potential Vs at the time of the imprint of each photo conductor drum 21, respectively -1700V, Potential Vw of White Portion by 1800V, -1900V and -2000V, and Exposure, Respectively - -1100V, - Magenta Which Has Negative Polarity by Which Became 1200V, -1300V, and about -1400V, and Reversal Development was Carried Out as a Result (M), Cyanogen (C) and each black (K) toner image are imprinted with the high rate of an imprint around 90% of the same grade as the toner image of yellow (Y) with which an imprint is made by the beginning to a transfer paper P although the frequency of superposition increases, and the right color toner image of a color-balance is recorded.

[0054] The transfer paper P which had the surface toner image imprinted is further set to 3 rotation eye of middle imprint drum 10B. The charge which is equivalent to about [+1.5kV] high imprint bias voltage with rear-face corona-transfer machine 17A is given. After the inferior surface of tongue of a transfer paper P imprinted collectively synchronizing with the color toner image on the front face of a manuscript which imprinted previously the color toner image on the rear face of a manuscript which middle imprint drum 10B supports on the surface of paper, Electric discharge machine 17B removes electrification, an operation of the separation presser foot stitch tongue 18 put on the slide contact state dissociates from on middle imprint drum 10B, and it is conveyed further to the fixing means 40. It sets for the fixing means 40, and after being heated and stuck by pressure with the heating roller 41 of a vertical couple and being

fixed to the color toner image of front reverse side both sides on a transfer paper P, a transfer paper P is discharged by delivery roller pair r3 on a delivery tray.

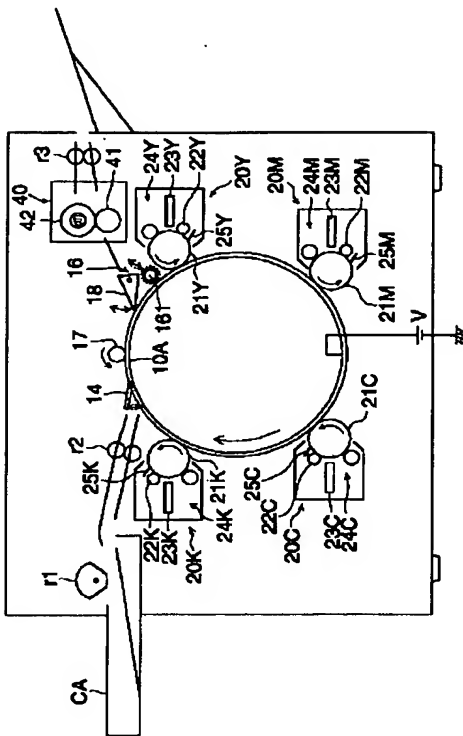
[0055] Middle imprint drum 10B which separated the transfer paper P on the other hand is cleaned by the slide contact rotation to the drum side of the fur brush 161 of the cleaning means 16, and ends the process of image formation.

[0056]

[Effect of the Invention] Of this invention, the high-definition color picture which was excellent in the color-balance with the so-called color picture means forming of a tandem system will be formed, and a claim 1 will be provided [an indirect imprint method and a pan] with the equipment by the claim 3 as each color picture formation equipment of a double-sided imprint method by the direct imprint method and the claim 2.

[Translation done.]

Drawing selection [R presentativ drawing]



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JAPANESE [JP,10-260563,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

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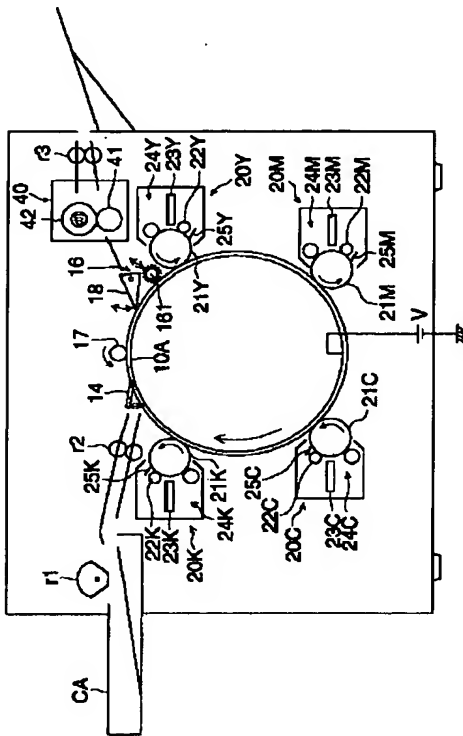
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TECHNICAL FIELD

[The technical field to which invention belongs] this invention relates to the color picture formation equipment of the electrophotography method which is made to pile up each other's toner image formed on two or more image formation objects, and forms a color picture.

[Translation done.]

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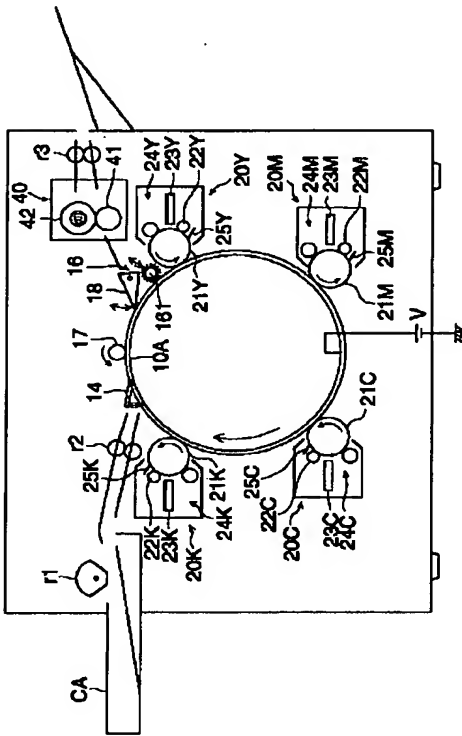
PRIOR ART

[Description of the Prior Art] Although various color picture formation equipments of an electrophotography method are proposed, promising ** of the tandem system (method which uses two or more photo conductors) as a color system which has broad correspondence in print speed or a future information society which can carry out parallel processing of the four colors simultaneously is carried out.

[0003] As the method of forming the multicolor color picture by this tandem system Research of the method which piles up the toner image of the monochrome formed in each image-formation object of two or more image-formation units which have arranged the development means, the exposure means, etc. around an image formation object on a middle imprint object, forms and bundles up a color picture, and is imprinted on imprint material, or the method which imprints each toner image of the aforementioned monochrome one by one on direct imprint material, and forms a color picture is made.

[Translation done.]

Drawing selection [Representativ drawing] ☒



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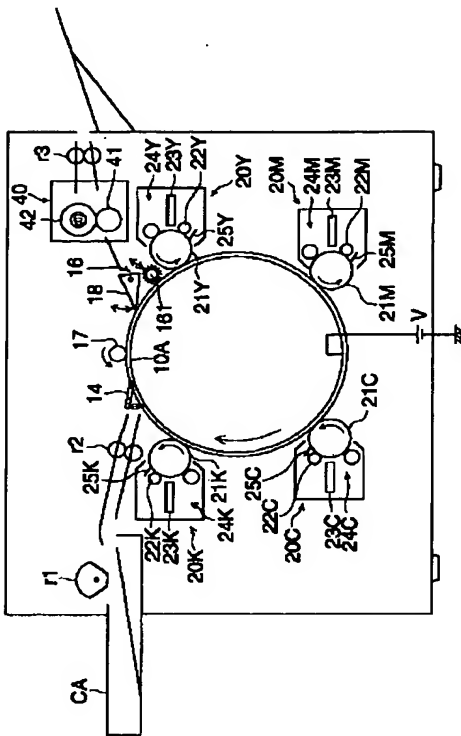
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EFFECT OF THE INVENTION

[Effect of the Invention] Of this invention, the high-definition color picture which was excellent in the color-balance with the so-called color picture means forming of a tandem system will be formed, and a claim 1 will be provided [an indirect imprint method and a pan] with the equipment by the claim 3 as each color picture formation equipment of a double-sided imprint method by the direct imprint method and the claim 2.

[Translation done.]

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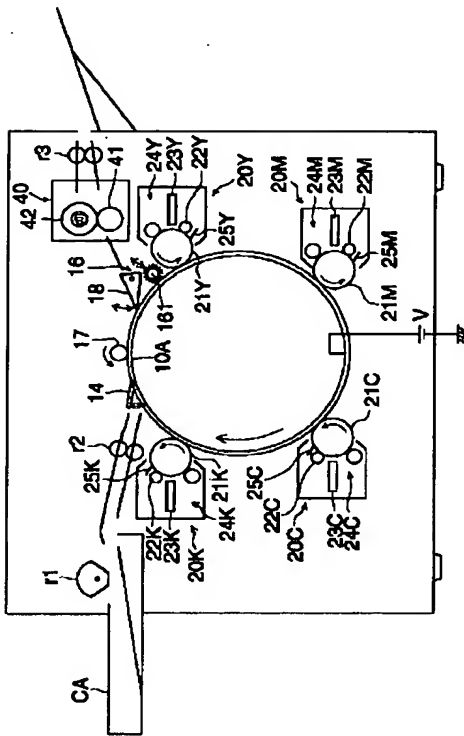
TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, it was unavoidable that the color picture which it was not avoided that the rate of an imprint falls as the toner image on an image formation object was piled up also to any of a middle imprint object or imprint material, therefore was formed of the aforementioned all directions formula has a difficulty in color balance.

[0005] this invention is imprinted by the sequence and the frequency of superposition with the high rate of an imprint which was altogether fixed regardless of the toner image on an image formation object, as a result of solving and improving this point, and it aims at offer of the color picture formation equipment which can form the color picture which was excellent in color balance with it.

[Translation done.]

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MEANS

[Means for Solving the Problem] 4 sets of image formation units which the above-mentioned purpose equips the circumference of an image formation object with a development means and an exposure means, and form a toner image on the aforementioned image formation object, The 4 aforementioned sets of image formation units are arranged around, and the toner image formed on the aforementioned image formation object is imprinted. In the color picture formation equipment which has an imprint means to form a color toner image, is made to pile up each other's toner image formed on the aforementioned image formation object one by one on the imprint material held at the aforementioned imprint means, and forms a color toner image the color picture formation equipment (invention concerning a claim 1) characterized by impressing bias voltage which is different in the base of the aforementioned image formation object while impressing bias voltage common to the aforementioned imprint means -- and 4 sets of image formation units which equip the circumference of an image formation object with a development means and an exposure means, and form a toner image on the aforementioned image formation object, The 4 aforementioned sets of image formation units are arranged around, and the toner image formed on the aforementioned image formation object is imprinted. In the color picture formation equipment which imprints collectively the color toner image which had an imprint means to form a color toner image, was made to pile up mutually one by one and was formed on the aforementioned imprint means on the imprint material held at the aforementioned imprint means the color picture formation equipment (invention concerning a claim 2) characterized by impressing bias voltage which is different in the base of the aforementioned image formation object while impressing bias voltage common to the aforementioned imprint means -- and 4 sets of image formation units which equip the circumference of an image formation object with a development means and an exposure means, and form a toner image on the aforementioned image formation object, The 4 aforementioned sets of image formation units are arranged around, and the toner image formed on the aforementioned image formation object is imprinted. Have an imprint means to form a color toner image, and the color toner image which was made to pile up mutually one by one and was formed on the aforementioned imprint means is collectively imprinted to one field of the imprint material held at the aforementioned imprint means. In the color picture formation equipment which is made to put each other's toner image formed on the aforementioned image formation object one by one on the field of another side of the aforementioned imprint material, imprints, and forms a color toner image, while impressing bias voltage common to the aforementioned imprint means It is attained by the color picture formation equipment (invention concerning a claim 3) characterized by impressing bias voltage which is different in the base of the aforementioned image formation object.

[0007]

[Embodiments of the Invention] Each color picture formation equipment of this invention is equipped with drum-like imprint object 10A or middle imprint object 10B (it names generically

below and considers as the imprint object 10) for all as show drawing 1 or drawing 3 , and yellow (Y), a Magenta (M), cyanogen (C), and each black (K) image formation unit 20 are arranged by the peripheral surface.

[0008] As the aforementioned imprint object 10 is shown in drawing 4 , the mold-release characteristic film layer 13 for separation of 50–500 micrometers in thickness, electric resistance 106 – 1014 ohm-cm is both further formed on it for example, on the conductive aluminum base 11 with the conductive elastic layer 12 of 1–10mm in thickness, electric resistance 102 – 106 ohm-cm.

[0009] The aforementioned imprint object 10 is electrically made the insulating state by measures, such as making width of face of the mold-release characteristic film layer 13 of high resistance, or the photosensitive layer of an image formation object larger than the width of face of the conductive elastic layer 12 of the imprint object 10, as opposed to the image formation object of the shape of a drum with which each aforementioned image formation unit 20 is equipped, and is enabling impression of the imprint bias voltage which became independent to each image formation object by it.

[0010] The aforementioned imprint object 10 is supported to revolve by the bearing which is not illustrated to the front face and rear panel which is not illustrated, and installs the axis of rotation of the imprint object 10 out of a rear panel further, and flywheel 10F as shown at the nose of cam at drawing 5 are prepared. These flywheel 10F do not have vibration of rotation of the imprint object 10, and in order to carry out smoothly, they give an inertia force.

[0011] Since the colors of the toner image formed, respectively only differ and 4 sets of image formation units 20Y, 20M, 20C, and 20K are carrying out the same composition, image formation unit 20Y is made into an example, and they explain it.

[0012] the circumference of photo conductor drum 21Y which is an image formation object as image formation unit 20Y is shown in drawing 4 -- image formation object electrification means 22Y (the following -- only -- electrification means 22Y --) or it is called electrification machine 22Y -- exposure means 23Y, development means 24Y, and image formation object cleaning means 25Y (the following -- only -- cleaning means 25Y --) or -- cleaning-blade 25Y -- saying -- it arranges and a yellow toner image is formed on photo conductor drum 21Y Moreover, what is necessary is to unify photo conductor drum 21Y and development means 24Y at least in addition to this in the gestalt of this operation, as a process cartridge although photo conductor drum 21Y, electrification means 22Y, development means 24Y, and cleaning means 25Y are unified among this image formation unit 20Y and it is removable. Photo conductor drum 21Y which forms a yellow toner image prepares a photoconductivity photosensitive layer on a conductive cylinder-like base. In order to make regularity the press force between the imprint objects 10, **** koro 211Y which contacts the imprint object 10 at photo conductor drum 21Y and the same axle is prepared in the ends of this photo conductor drum 21Y. Without forming the elastic layer 12, contact section 10T of the imprint object 10 with which **** koro 211Y contacts are constituted so that **** koro 211Y may contact the direct aluminum base 11. Moreover, photo conductor gear 212Y engaged to imprint object gear 10G of the imprint object 10 is prepared in one edge of photo conductor drum 21Y. Positioning with the imprint object 10 is made by these, and the rotation drive of the photo conductor drum 21Y is carried out in the direction which follows on the imprint object 10.

[0013] Electrification means 22Y is a means to give uniform potential to photo conductor drum 21Y, and in the gestalt of this operation, roller electrification machine 22Y of the shape of a roller which carries out follower rotation is used, contacting photo conductor drum 21Y.

[0014] Exposure means 23Y on photo conductor drum 21Y which was able to give uniform potential by roller electrification machine 22Y It is a means to be exposed based on a picture signal (yellow) and to form the electrostatic latent image corresponding to the picture of yellow. as this exposure means 23Y The thing which consists of a Light Emitting Diode which arranged the light emitting device in the shape of an array, and an image formation element (tradename;

selfoc lens), or a laser beam study system is used for the shaft orientations of photo conductor drum 21Y.

[0015] Development means 24Y is a means to hold the yellow toner which is a developer, to carry out reversal development of the electrostatic latent image formed on photo conductor drum 21Y, and to form a yellow toner image. the yellow toner held in development means 24Y in development means 24Y of the gestalt of this operation -- stirring -- a member -- after stirring by 241Y, the front face rotated in the direction of **** supplies development sleeve 243Y by toner feed roller 242Y of elasticity (sponge) this time -- thin layer formation -- a member -- let the yellow toner on development sleeve 243Y be a uniform thin layer by 244Y As opposed to development sleeve 243Y which rotates in the direction of **** on the occasion of a development operation of development means 24Y As opposed to photo conductor drum 21Y which a direct current or the development bias which added the alternating current further is impressed, and jumping development by one component or two component developer which development means 24Y holds is performed, and is grounded The bias which superimposed the toner, the dc component of like-pole nature, and the alternating current component is impressed, and non-contact reversal development is performed. In addition, the **** koro which was prepared in the both ends outside the picture field of development sleeve 243Y and which is not illustrated is maintaining development sleeve 243Y and photo conductor drum 21Y at non-contact by contacting photo conductor drum 21Y. In addition, not non-contact development but contact development can also be used.

[0016] The toner image of the yellow formed on photo conductor drum 21Y is positioned by **** koro 212Y, contacts the imprint object 10, and is directly imprinted by the imprint material on the imprint object 10, or imprint object 10 itself one by one with the imprint object 10 with which the bias voltage of a toner and reversed polarity is impressed.

[0017] After a yellow toner image is imprinted by the imprint material or the imprint object 10 on the imprint object 10, cleaning means 25Y is a means for removing the yellow toner which remained on photo conductor drum 21Y from on the photo conductor drum 10, and when cleaning-blade 25Y ****s to photo conductor drum 21Y, it is removing the remains toner in the gestalt of this operation.

[0018] Thus, the yellow toner image corresponding to the picture signal (yellow) formed of the distance of electrification, exposure, and reversal development is directly imprinted by image formation unit 20Y the imprint material on the imprint object 10, or imprint object 10 itself.

[0019] Similarly, on the photo conductor drums 21M and 21C and 21K, the other image formation units 20M, 20C, and 20K are formed, respectively, while the Magenta toner image corresponding to the picture signal (Magenta), the cyano toner image corresponding to the picture signal (cyanogen), and the black toner image corresponding to the picture signal (black) take a synchronization in parallel processing. And each photo conductor drums 21Y, 21M, and 21C of each image formation units 20Y, 20M, 20C, and 20K and the toner image formed on 21K impress the imprint bias mentioned later one by one, and is directly imprinted by the imprint material on the imprint object 10, or imprint object 10 itself, and a toner image piles it up.

[0020] (Gestalt 1 of operation) Drawing 1 explains the gestalt of implementation of invention concerning a claim 1.

[0021] The imprint object 10 with which the equipment of this operation gestalt is equipped is the aforementioned imprint drum 10A, and the gripper 14 for grasping the nose of cam of a transfer paper P, the adsorption means 17, and the separation means 18 are formed in the circumference. The adsorption roller 17 which is an adsorption means is a means to stick the transfer paper P which it could attach and detach [transfer paper] and had the nose of cam grasped by the gripper 14 on imprint drum 10A. This adsorption roller 17 carries out follower rotation to imprint drum 10A like **** at the time of contact, and it makes electrostatic stick it on imprint drum 10A, forcing on imprint drum 10A the transfer paper P which had the nose of cam where it moves with rotation of imprint drum 10A grasped. The separation presser foot

stitch tongue 18 which is a separation means is a means to perform separation for the held transfer paper P from on imprint drum 10A. Like ****, to imprint drum 10A, this separation presser foot stitch tongue 18 is formed possible [attachment and detachment], and only when separating a transfer paper P, it ****s to imprint drum 10A.

[0022] The process of the image formation by above equipment is explained below.

[0023] With the power of the drive motor which is not illustrated according to the start of image recording, the photo conductor drum 21 of each aforementioned image formation unit 20 rotates [the aforementioned imprint drum 10A] counterclockwise according to a clockwise rotation, respectively.

[0024] According to the timing by which the picture signal according to color of a manuscript picture was beforehand set as each aforementioned exposure means 23, it is inputted one by one, and each toner image according to color is formed on the photo conductor drum 21 of each image formation unit 20.

[0025] On the other hand in parallel to this, feeding of a transfer paper P is started from the feed cassette CA. That is, a transfer paper P is sent to timing roller pair r2 which are a supply means by the operation of the feed roller r1, and timing roller pair r2 send out a transfer paper P to predetermined timing. The transfer paper P sent out by timing roller pair r2 advances so that it may run against imprint drum 10A, it has the nose of cam grasped by the gripper 14 of imprint drum 10A, and rotates in the **** direction (clockwise rotation) with imprint drum 10A.

[0026] A transfer paper P is stuck to a drum side electrostatic, being pushed against a drum side with the adsorption roller 17 which was made into the contact state at imprint drum 10A and which carries out follower rotation, passes through the bottom of the separation presser foot stitch tongue 18 estranged from the drum side, and is fed to the imprint region of a picture. A contact state is maintained to back end passage of a transfer paper P.

[0027] If in charge of the imprint of each aforementioned toner image, the bias voltage of +1000V which are the reversed polarity of a toner (it sets in this operation gestalt and is minus polarity) as common bias voltage is impressed to the base of imprint drum 10A. On the other hand to the photo conductor drum 21 of each image formation unit 20, the timing of an imprint of each toner image to form is received at photo conductor drum 21Y. As opposed to 0V photo conductor drum 21M As opposed to -100V photo conductor drum 21C As opposed to -200V photo conductor drum 21K As the frequency of superposition increases so that it may be called -300V The imprint bias voltage which becomes high gradually is impressed from the photo conductor drum on which the imprint to image formation and a transfer paper P is made previously.

[0028] Therefore, supposing it set the electrification voltage when setting the base to each photo conductor drum 21 to 0V as -700V and sets white potential as -100V Each photo conductor drum 21 electrification potential Vs, respectively -700V, -800V, Potential Vw of White Portion by 900V and -1000V, and Exposure, Respectively - -100V, - Although Frequency of Each Black (K) Toner Image [Magenta (M) and Cyanogen (C) Which Have Negative Polarity by Which Changed with 200V, -300V, and -400V, and Reversal Development was Carried Out as a Result, and] of Superposition Increases It will imprint with the high rate of an imprint around 90% of the same grade as the toner image of yellow (Y) with which an imprint is made by the beginning to a transfer paper P, therefore the right picture of a color-balance will be formed.

[0029] The contact to the drum side of the aforementioned separation presser foot stitch tongue 18 dissociates from a drum side, and fixing equipment 40 is fed with the transfer paper P which finished the imprint of the toner image of Y, M, C, and K each color by one rotation of imprint drum 10A. Fastening heating is carried out with the heating roller 42 and the sticking-by-pressure roller 41, weld a toner, and it is discharged on a delivery tray through delivery roller pair r3. Imprint drum 10A which separated the transfer paper P on the other hand is cleaned by the slide contact rotation to the drum side of the fur brush 161 of the cleaning means 16, and ends the process of image formation.

[0030] In addition, in order to raise the separability from the imprint drum side of a transfer paper P, it is effective to perform AC electric discharge in the upper section of the separation presser foot stitch tongue 18 with a corona discharge vessel at a transfer paper P.

[0031] (Form 2 of operation) Drawing 2 explains the form of implementation of invention concerning a claim 2.

[0032] The imprint object 10 with which the equipment of this operation form is equipped is the aforementioned middle imprint drum 10B, and the paper electrification brush 15 for a transfer paper P being charged, imprint machine 17A, electric discharge machine 17B, and the separation presser foot stitch tongue 18 are formed in the peripheral surface. The paper electrification brush 15 is a means electrify the transfer paper P to which paper was fed in slide contact with middle imprint drum 10B only at the time of feeding to stick to middle imprint drum 10B, and only when the separation presser foot stitch tongue 18 is a means to separate the imprint drum P which imprinted the toner image from a drum side, is formed possible [attachment and detachment] to the drum side and a transfer paper P is separated, it is contacted by the drum side.

[0033] The process of the image formation by above equipment is explained below.

[0034] According to a clockwise rotation, the photo conductor drum 21 of each aforementioned image formation unit 20 rotates [the aforementioned middle imprint drum 10B] counterclockwise, respectively with the power of the drive motor which is not illustrated according to the start of image recording.

[0035] According to the timing by which the picture signal according to color of a manuscript picture was beforehand set as each aforementioned exposure means, it is inputted one by one, and each toner image according to color is formed on the photo conductor drum 21 of each image formation unit 20.

[0036] You make it pile up each of each other's toner image on each aforementioned photo conductor drum 21 one by one on the peripheral surface of middle imprint drum 10B, and it imprints, and considers as a color toner image, and the fur brush 161 of paper electrification brush 14A of the during-this-period above, the separation presser foot stitch tongue 18, and the cleaning means 16 is put on the position which each estranged to the drum side.

[0037] In the imprint of each aforementioned toner image, the base of middle imprint drum 10B is set to +500V in the bias voltage to impress. On the other hand, the photo conductor drum 21 of each image formation unit 20 is received. To the timing of an imprint of the toner image which ***** forms As opposed to photo conductor drum 21Y As opposed to -300V photo conductor drum 21M As opposed to -450V photo conductor drum 21C As opposed to -500V photo conductor drum 21K As the frequency of superposition increases so that it may be called -550V The imprint bias voltage which becomes high gradually is impressed from the photo conductor drum on which the imprint to image formation and middle imprint drum 10B is made previously.

[0038] Therefore, supposing it set the electrification voltage when setting the base to each photo conductor drum 21 to 0V as -700V and sets white potential as -100V The electrification potential Vs of each photo conductor drum 21, respectively -1500V, -1650V, Potential Vw of White Portion by 1700V and -1750V, and Exposure, Respectively - -900V, - Magenta Which Has Negative Polarity by Which Changed with 1050V, -1100V, and -1150V, and Reversal Development was Carried Out as a Result (M), Cyanogen (C) and each black (K) toner image will be imprinted with the high rate of an imprint around 90% of the same grade as the toner image of yellow (Y) with which an imprint is made by the beginning to middle imprint drum 10B although the frequency of superposition increases. Therefore, the right toner image of a color-balance will be formed on middle imprint drum 10B.

[0039] On the other hand in parallel to this, feeding of a transfer paper P is started from the feed cassette CA, a transfer paper P is sent to the timing roller r2 which is a supply means by the operation of the feed roller r1, and the timing roller r2 sends out a transfer paper P to

predetermined timing. The transfer paper P sent out with the timing roller r2 is stuck to a drum side, and is fed to an imprint region by the slide contact of the paper electrification brush 15 to which it advanced so that it might dash against middle imprint drum 10B, and it changed into the middle imprint drum 10 and the contact state synchronizing with the transfer paper P, and the voltage of $-1.0\text{--}2.0\text{kV}$ of a toner and like-pole nature was impressed synchronizing with the picture field of the color toner image on middle imprint drum 10B.

[0040] After the charge which is equivalent to about $+1.5\text{kV}$ high imprint bias voltage on the surface of paper in an imprint region with corona-transfer machine 17A was given to the transfer paper P, and the color toner image on middle imprint drum 10B of the undersurface was put in block and imprinting. Depending on the need, the exfoliation operation of the aforementioned separation presser foot stitch tongue 18 made into the slide contact state in the drum side separates into the segregation pan by corona electric discharge machine 17B from a drum side, and fixing equipment 40 is fed. Fastening heating is carried out with the heating roller 42 and the sticking-by-pressure roller 41, a toner is welded, and it is discharged on a delivery tray through the delivery roller r3. Middle imprint drum 10B which separated the transfer paper P on the other hand is cleaned by the slide contact rotation to the drum side of the fur brush 161 of the cleaning means 16, and ends the process of image formation.

[0041] (Form 3 of operation) Drawing 3 explains the form of implementation of invention concerning a claim 3.

[0042] The imprint object 10 with which this operation form is equipped is the aforementioned middle imprint drum 10B. Make it put each of each other's toner image formed of each aforementioned image formation unit 20 one by one on the drum side of middle imprint drum 10B, and the toner image of a color is formed. It makes it possible to have imprinted this collectively to imprint material, to have laid on top of the imprint material which held each further aforementioned toner image to the drum side directly, and to consider as the toner image of a color.

[0043] Rear-face imprint machine 17A for imprinting the toner image on middle imprint drum 10B to the paper electrification brush 15 for the gripper 14 for grasping the nose of cam of the transfer paper P supplied from timing roller pair r2 around the aforementioned middle imprint drum 10B and a transfer paper P being charged, and a transfer paper P. The cleaning means 16 for removing the remains toner of drum lifting to separation presser-foot-stitch-tongue 18 pan is formed in the electric discharge machine 17B row for separating a transfer paper P from a drum side. Attachment and detachment of the fur brush 161 of the aforementioned gripper 14, the paper electrification brush 15, the separation presser foot stitch tongue 18, and the cleaning means 16 is enabled so that a pressure welding may be carried out to a drum side only at the time of each use.

[0044] The process of the double-sided image formation by above equipment is explained below. The image data according to each color of the manuscript table reverse side read by the picture reader of another object as a manuscript picture is memorized and stored in memory.

[0045] Middle imprint drum 10B rotates and, clockwise, the photo conductor drum 21 of each aforementioned image formation unit 20 rotates counterclockwise simultaneously with the power of the drive motor which is not illustrated according to the start of image recording, respectively.

[0046] From the aforementioned memory, each picture signal according to color on the rear face of a manuscript is first outputted one by one according to the timing set up beforehand, each toner image according to color is formed on the photo conductor drum 21 of each image formation unit 20, the peripheral surface of middle imprint drum 10B imprints one by one, and the color toner image on the rear face of a manuscript is set [it piles it up and] and formed. The gripper 14 of the during-this-period above is buried in a drum side, and the paper electrification machine 15 and the separation presser foot stitch tongue 18 are maintained at the position estranged from the drum side.

[0047] In the imprint to middle imprint drum 10B of each aforementioned toner image The base of middle imprint drum 10B is directly grounded considering the bias voltage to impress as 0V. On the other hand, the photo conductor drum 21 of each image formation unit 20 is received. the timing of the imprint drum of the toner image which ***** forms -- photo conductor drum 21Y -- receiving -- -800V photo conductor drum 21M -- receiving -- -950V photo conductor drum 21C -- receiving -- -1000V photo conductor drum 21K -- receiving -- The imprint bias voltage which becomes high gradually is impressed from the photo conductor drum on which the imprint to image formation and middle imprint drum 10B is made previously as the frequency of the superposition of a toner image increases so that it may be called -1050V.

[0048] Therefore, supposing it set the electrification voltage when setting the base to each photo conductor drum 21 to 0V as -700V and sets white potential as -100V The electrification potential Vs of each photo conductor drum 21, respectively -1500V, -1650V, Potential Vw of White Portion by 1700V and -1750V, and Exposure, Respectively - -900V, - Magenta Which Has Negative Polarity by Which Became 1050V, -1100V, and about -1150V, and Reversal Development was Carried Out as a Result (M), Although the frequency of each black (K) toner image [cyanogen (C) and] of superposition increases It will imprint with the high rate of an imprint around 90% of the same grade as the toner image of yellow (Y) to middle imprint drum 10B, and the right color toner image of a color-balance is formed on middle imprint drum 10B.

[0049] Each photo conductor drum which finished the imprint of a toner image removes a remains toner by the slide contact of cleaning-blade 25C', and is cleaned.

[0050] Subsequently, each picture signal according to color on the front face of a manuscript is outputted one by one, formation of each toner image according to color is started by photo conductor drum lifting of each image formation unit, and feeding of a transfer paper P is further started from the feed cassette CA in parallel.

[0051] That is, a transfer paper P is taken out out of the feed cassette CA by the operation of the feed roller r1, and is sent to timing roller pair r2 which are a supply means to supply a transfer paper P to middle imprint drum 10B. Timing roller pair r2 send out a transfer paper P to predetermined timing. The transfer paper P sent out by timing roller pair r2 runs against middle imprint object drum 10B, and has the nose of cam grasped by the gripper 14 of middle imprint drum 10B. If the nose of cam of a transfer paper P is grasped with a gripper 14, middle imprint drum 10B will rotate in the direction of ****. Moving with rotation of middle imprint drum 10B, and being pushed against middle imprint drum 10B with the paper electrification brush 15, a transfer paper P is stuck on middle imprint drum 10B electrostatic, and passes the lower part of the separation presser foot stitch tongue 18 estranged to middle imprint drum 10B. Then, the photo conductor drums 21Y, 21M, and 21C of the image formation units 20Y, 20M, 20C, and 20K mentioned above and the toner image formed on 21K are imprinted one by one on the transfer paper P held on middle imprint drum 10B, a toner image piles up on a transfer paper P, and a color toner image is formed. If a color toner image is formed, grasping of the transfer paper P by the gripper 14 will be canceled, and the imprint of the color toner image on the front face of a manuscript to a transfer paper P will be ended by 2 rotation eye of middle imprint drum 10B. In addition, image data is beforehand changed so that the surface picture formed at this time may turn into a mirror image mutually [a rear-face picture] on middle imprint drum 10B.

[0052] In the imprint to the transfer paper P of each aforementioned toner image The base of middle imprint drum 10B is directly grounded considering the bias voltage to impress as 0V. On the other hand, the photo conductor drum 21 of each image formation unit 20 is received. To the timing of an imprint of the toner image which ***** forms As opposed to photo conductor drum 21Y As opposed to -1000V photo conductor drum 21M As opposed to -1100V photo conductor drum 21C As opposed to -1200V photo conductor drum 21K As the frequency of the superposition of a toner image increases so that it may be called -1300V The imprint bias voltage which becomes high gradually is impressed from the photo conductor drum on which the imprint to a transfer paper P is made previously. Since the transfer paper is minded, imprint bias

voltage is set up more highly than the case where a transfer paper is not minded.

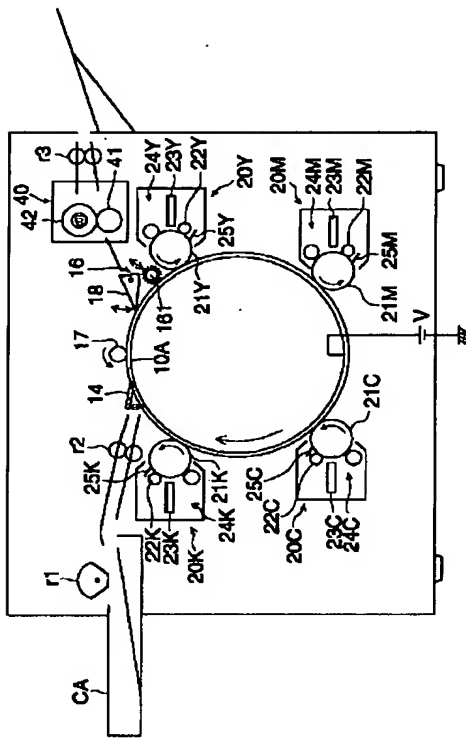
[0053] Therefore, supposing it set the electrification voltage when setting the base to each photo conductor drum 21 to 0V as -700V and sets white potential as -100V The electrification potential V_s at the time of the imprint of each photo conductor drum 21, respectively -1700V, Potential V_w of White Portion by 1800V, -1900V and -2000V, and Exposure, Respectively -1100V, -Magenta Which Has Negative Polarity by Which Became 1200V, -1300V, and about -1400V, and Reversal Development was Carried Out as a Result (M), Cyanogen (C) and each black (K) toner image are imprinted with the high rate of an imprint around 90% of the same grade as the toner image of yellow (Y) with which an imprint is made by the beginning to a transfer paper P although the frequency of superposition increases, and the right color toner image of a color-balance is recorded.

[0054] The transfer paper P which had the surface toner image imprinted is further set to 3 rotation eye of middle imprint drum 10B. The charge which is equivalent to about [+1.5kV] high imprint bias voltage with rear-face corona-transfer machine 17A is given. After the inferior surface of tongue of a transfer paper P imprinted collectively synchronizing with the color toner image on the front face of a manuscript which imprinted previously the color toner image on the rear face of a manuscript which middle imprint drum 10B supports on the surface of paper, Electric discharge machine 17B removes electrification, an operation of the separation presser foot stitch tongue 18 put on the slide contact state dissociates from on middle imprint drum 10B, and it is conveyed further to the fixing means 40. It sets for the fixing means 40, and after being heated and stuck by pressure with the heating roller 41 of a vertical couple and being fixed to the color toner image of front reverse side both sides on a transfer paper P, a transfer paper P is discharged by delivery roller pair r3 on a delivery tray.

[0055] Middle imprint drum 10B which separated the transfer paper P on the other hand is cleaned by the slide contact rotation to the drum side of the fur brush 161 of the cleaning means 16, and ends the process of image formation.

[Translation done.]

Drawing selection [Representative drawing] 



[Translation done.]

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JAPANESE

[JP,10-260563,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The cross-section block diagram of the color picture formation equipment (the 1) of this invention.

[Drawing 2] The cross-section block diagram of the color picture formation equipment (the 2) of this invention.

[Drawing 3] The cross-section block diagram of the color picture formation equipment (the 3) of this invention.

[Drawing 4] The cross-section block diagram of an image formation unit.

[Drawing 5] The perspective diagram showing an imprint drum and an image formation unit.

[Description of Notations]

10A Imprint object (imprint drum)

10B Middle imprint object (middle imprint drum)

14 Gripper

15 Paper Electrification Brush

16 Cleaning Means

17 Adsorption Roller (Adsorption Means)

17A (Rear face) Imprint machine (corona)

17B (Corona) Electric discharge machine

18 Separation Presser Foot Stitch Tongue

20 Image Formation Unit

21 Photo Conductor Drum

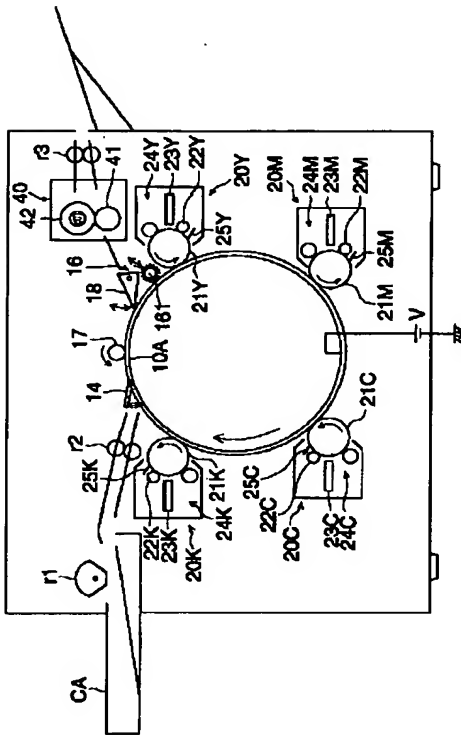
22 Electrification Means

23 Exposure Means

24 Development Means

[Translation done.]

Drawing selection [Representativ drawing] 



[Translation done.]

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JAPANESE [JP,10-260563,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

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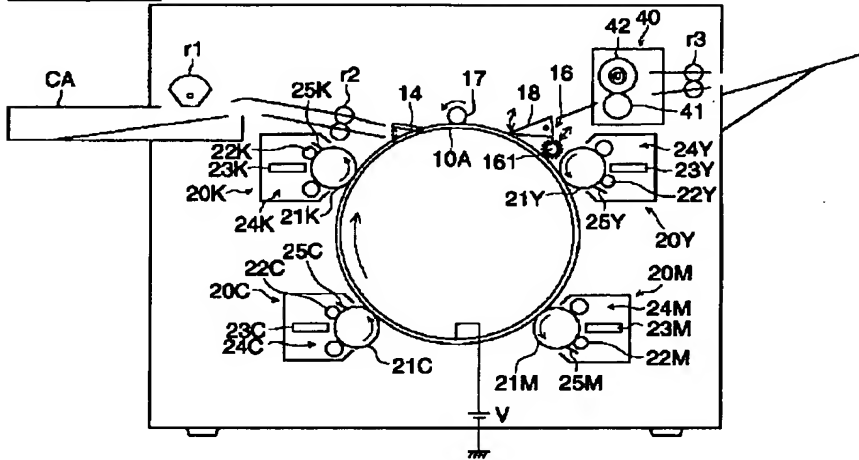
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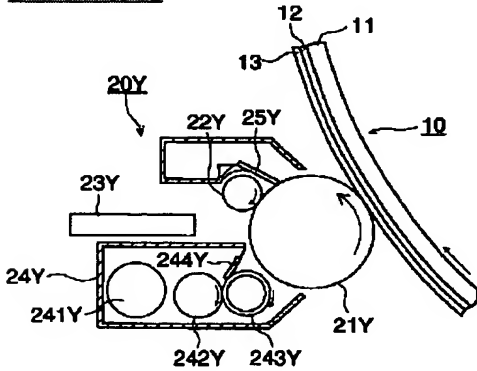
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DRAWINGS

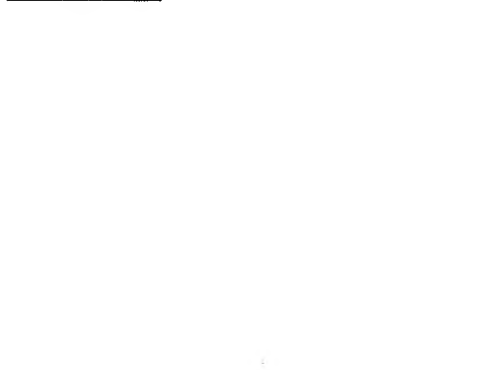
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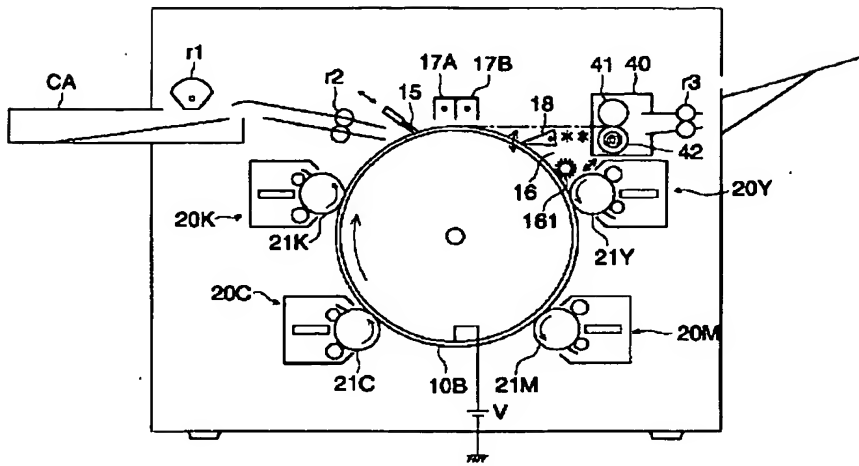


[Drawing 4]

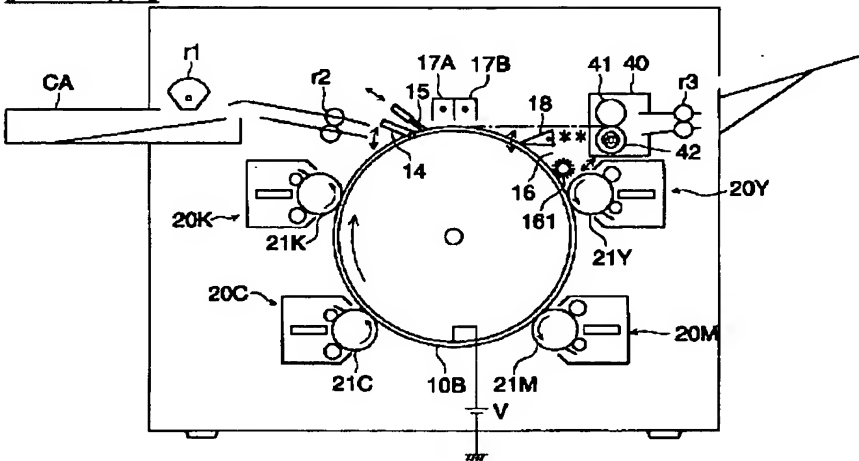


[Drawing 2]

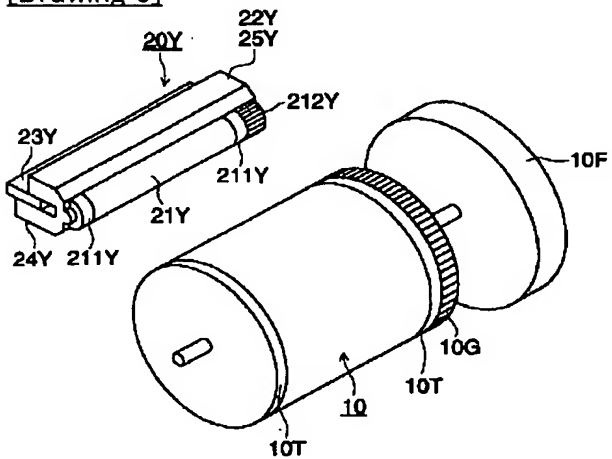




[Drawing 3]

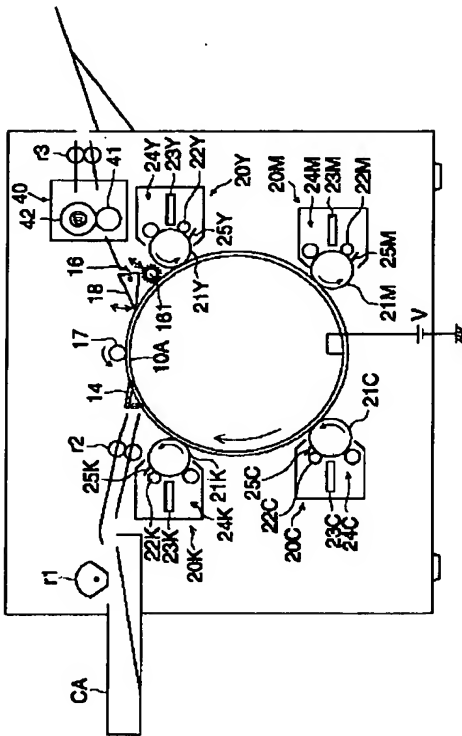


[Drawing 5]



[Translation done.]

Drawing selection [Representative drawing] 



[Translation done.]

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